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Motorcycle Emission Control Demonstration

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MOTORCYCLE EMISSION CONTROL DEMONSTRATION

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This report describes the testing of ten motorcycles for exhaust emissions of hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NO_x). Emission rates in grams per kilometer are presented for the 1975 Federal Test Procedure and the Highway Fuel Economy Test, as well as in percent or parts per million for several steady-state conditions. The test motorcycles were equipped with 2-stroke, 4-stroke, and rotary engines ranging from about 100 to 1000 cc displacement. Several exhaust emission control techniques were applied, including minor and major carburetor enleanment with and without capacitive discharge ignition, secondary air injection with both pumps and reed valves, port liners, thermal reactors, oxidation catalysts, rotary valve modification, a spark ignited afterburner, and a short-circuited air-fuel mixture extraction system. Driveability, performance, and maladjustment (stock only) testing were also performed. All testing was performed with low accumulated distance on the motorcycles.

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FOREWORD

The project on which this report is based was initiated by EPA Request for Proposal No. CI-75-0252, dated July 18, 1975. After acceptance of SwRI's Proposal No. 11-1452, dated August 29, 1975, Contract No. 68-03-2391 was awarded on March 10, 1976. The project was identified within SwRI as Project No. 11-4508.

Project Officers for EPA's Technology Assessment Branch during the project were Mr. Randall H. Field and (previously) Mr. David L. Tripp. Several meetings were held with these project officers to decide on motorcycle selection and control applications. Charles T. Hare and Karl J. Springer were overall supervisors of the program; Terry L. Ullman was SwRI Project Leader; and technical personnel were Jim Boylan (lead technician), Ken Norman, John T. Jack, Nathan Reeh, and Rick Emmert.

The assistance of several individuals and groups has contributed to the successful completion of this project. We would like to express our appreciation to:

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ABSTRACT

In order to generate data on the effectiveness of available motorcycle emission control technology, ten motorcycles were selected for testing on the basis of sales data and engine design. The 2-stroke motorcycles chosen were the Suzuki GT-750, Kawasaki KH-500, Yamaha RD-400C, Kawasaki KE-175, and Suzuki TS-100. The 4-stroke motorcycles were the Honda GL-1000, Kawasaki KZ-900, Suzuki RE-5 (rotary), Honda CB-360T, and Honda XL-125.

Applied singly and in combination, "proof of principle" demonstrations were conducted on carburetor enleanment, capacitive-discharge ignition, air injection by reed valve and by pump, catalysts, thermal reactors, port liners, rotary valve modifications, and a spark-ignited afterburner. Most of the emission control techniques were applied to two or more machines to determine the sensitivity of control measures to engine size and type.

The primary test procedure used to determine control effectiveness was the motorcycle FTP, with corresponding FETs conducted in as many cases as possible. Steady-state emission measurements were conducted whenever necessary to set up or document the performance of emission control measures. Performance evaluations included 0-100 kph accelerations and a modified automobile driveability procedure.

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I. INTRODUCTION

The program of research on which this report is based was initiated by EPA to demonstrate the extent to which available control techniques could reduce emissions from a representative group of the motorcycle population. In light of the recently-established motorcycle emission standards, shown in Table 1, it is assumed that extensive studies of emission control have been conducted by major motorcycle manufacturers.(1)* The control effectiveness achieved by this project's "proof of principle" demonstrations represent minimum results which could be achieved by modest research efforts on the part of any motorcycle manufacturer. It is likely that many of the experiments conducted in this program will already have been done by one or more manufacturers, but the results of this program will be open to the public. It is hoped that the results will be valuable to manufacturing companies which cannot afford independent studies and to the manufacturers of emission control hardware and other components for motorcycle application.

TABLE 1. CURRENT FEDERAL MOTORCYCLE EMISSION REGULATIONS

Effective Date	Engine Displ., cm^3	Standards, g/km			Other Regulations[a]	Useful life, km	Emission dist.,data km
		HC	CO	NO_x			
1/01/78	50 to 170	5.0	17	---	crankcase	12,000	2,500
	170 to 750	varies[b]	17	---	crankcase	18,000	2,500
	750 & up	14	17	---	crankcase	30,000	3,500
1/01/80	50 to 170	5.0	12	---	crankcase	12,000	2,500
	170 to 750	5.0	12	---	crankcase	18,000	2,500
	750 & up	5.0	12	---	crankcase	30,000	3,500

[a] "crankcase" means total crankcase control

[b] linear from 5.0 - 14 g/km [i.e., 5.0 + 0.0155 (displ - 170)]

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* Superscript numbers in parentheses refer to References at end of this report.

II. SUMMARY

This project was conducted to demonstrate "proof of principle" regarding emission control applications on motorcycles. Ten motorcycles were chosen for emission characterization and control studies, based on the 1975 motorcycle population and 1976 engine design availability. Of these ten motorcycles, four were of the 4-stroke engine type (Honda GL-1000, Kawasaki KZ-900, Honda CB-360, and Honda XL-125); one was a rotary (Suzuki RE-5); and the remaining five were of 2-stroke design (Suzuki GT-750, Kawasaki KH-500, Yamaha RD-400, Kawasaki KE-175, and Suzuki TS-100). A variety of emission control techniques were considered. The control techniques selected for demonstration were based primarily on the availability of hardware and the probability of success in application within the financial and time constraints of this program. The primary control measures selected were carburetion changes, air injection, thermal reactors, and catalysts. Secondary approaches included port liners, spark-ignited afterburning, and rotary valve modification. Several combinations of these measured were applied to the motorcycles in stepwise fashion. Some measures were applied cumulatively, while others were applied separately.

After completing zero-kilometer (green engine) testing and engine break-in according to the owner's manual, baseline emissions from all of the motorcycles were measured in preparation for implementation of the selected control measures. Table 2 summarizes emission and performance test results obtained for all ten motorcycles. The results are given in order of decreasing displacement in two engine categories, 4-stroke and 2-stroke. Results shown are averages where possible; but in some cases, single runs are presented for reference when the control application was under development and there was a need to see what progress had been made to that point. No transient emission tests were performed if the control measure proved ineffective. Wide open throttle (WOT) acceleration times and driveability ratios are given for most test configurations.

The driveability ratio shown was based on a demerit system adapted for this project from an automotive procedure. The demerit rating obtained during baseline configuration (stock) was used as the denominator for each individual motorcycle, and the numerator was the demerit rating obtained during subsequent testing. Therefore, all motorcycles have a baseline driveability ratio of 1.0. Subsequent ratios less than 1.0 indicate improvement in driveability, whereas ratios greater than 1.0 indicate driveability degradation. The numerical results of this subjective rating system did not correlate well with the riders' judgment of driveability in most cases. Lack of correlation is attributed to the lack of familiarity with the individual motorcycle's driveability during the baseline rating and the relatively large time lapse between subsequent road evaluations.

Minor carburetor enleanment generally consisted of using available carburetor adjustment (idle mixture screw and jet needle clip position) to effect leaner (than stock) mixture. Both HC and CO emissions were reduced on 4-stroke motorcycles, whereas lean carburetor adjustment primarily reduced only CO from 2-stroke machines. Problems of driveability (and engine seizure on one 2-stroke) accompanied over-enleanment in some cases. Lean carburetor adjustments followed by road trials were used to maintain driveability before

TABLE 2. SUMMARY OF EMISSION RESULTS FOR 2-STROKE MOTORCYCLES

HONDA GL-1000			Baseline Results	Test Results with Application of Control Measures (% change from baseline values in parentheses)				
Test Configuration		1978 Std.	Stock	Air Injection	Catalyst Only[a]	+ Air Addition		
FTP Results	HC, g/km	14.	1.99	No FTP results - Ineffective control measure	0.50 (-75.)	0.33 (-83.)		
	CO, g/km	17.	11.32		3.90 (-66.)	2.11 (-81.)		
	NO_x, g/km		0.40		0.20 (-50.)	0.26 (-35.)		
	Fuel, km/ℓ		14.1		15.6 (+11.)	16.1 (+14.)		
FET Results	HC, g/km		0.66	No FET results - Ineffective control measure	0.24 (-64.)	0.13 (-80.)		
	CO, g/km		4.66		3.23 (-31.)	1.06 (-77.)		
	NO_x, g/km		0.49		0.19 (-61.)	0.35 (-29.)		
	Fuel, km/ℓ		21.2		22.6 (+7.1)	23.5 (+11.)		
Acceleration 0-100 kph, sec			5.6	—	5.6	6.2		
Driveability Ratio Incl. Stall			1.0	—	—	0.9		
Driveability Ratio			1.0	—	—	1.2		

KAWASAKI KZ-900			Baseline Results	Test Results with Application of Control Measures (% change from baseline values in parentheses)				
Test Configuration		1978 Std.	Stock	Minor Enleanment & CDI	+ Air Injection & Insulation	+ Port Liners	+ Catalyst (Air Rate Modified)	
FTP Results	HC, g/km	14.	3.28	1.73 (-47.)	2.21 (-33.)	1.59 (-52.)	0.40 (-88.)	
	CO, g/km	17.	28.29	17.82 (-37.)	10.06 (-64.)	8.77 (-69.)	1.85 (-94.)	
	NO_x, g/km		0.15	0.34 (+130)	0.34 (+130)	0.32 (+110)	0.22 (+47.)	
	Fuel, km/ℓ		18.5	19.6 (+5.9)	17.0 (-8.1)	18.0 (-2.7)	18.6 (+0.5)	
FET Results	HC, g/km		0.84	0.46 (-45.)	0.43 (-49.)	0.31 (-63.)	0.06 (-93.)	
	CO, g/km		20.12	4.31 (-79.)	1.91 (-90.)	2.13 (-89.)	0.36 (-98.)	
	NO_x, g/km		0.27	0.73 (+170)	0.67 (+150)	0.72 (+170)	0.42 (+56.)	
	Fuel, km/ℓ		25.1	25.9 (+3.2)	22.9 (-8.8)	25.6 (+2.0)	26.0 (+3.6)	
Acceleration 0-100 kph, sec			5.5	5.5	5.4	5.9	5.5	
Driveability Ratio Incl. Stall			1.0	1.0	0.6	0.8	0.6	
Driveability Ratio			1.0	0.5	0.9	1.2	1.0	

SUZUKI RE-5 (ROTARY)			Baseline Results	Test Results with Application of Control Measures (% change from baseline values in parentheses)				
Test Configuration		1978 Std.	Stock	Air Injection	Catalyst Only[a]	+ Air Addition		
FTP Results	HC, g/km	14.	6.34	No FTP results - Ineffective control measure	3.28 (-48.)	0.58 (-91.)		
	CO, g/km	17.	22.72		21.23 (-6.6)	4.40 (-81.)		
	NO_x, g/km		0.21		0.08 (-62.)	0.19 (-9.5)		
	Fuel, km/ℓ		12.2		11.6 (-4.9)	12.9 (+5.7)		
FET Results	HC, g/km		2.06	No FET results - Ineffective control measure	0.81 (-61.)	0.33 (-84.)		
	CO, g/km		6.88		5.99 (-13.)	0.94 (-86.)		
	NO_x, g/km		0.37		0.17 (-54.)	0.43 (+16.)		
	Fuel, km/ℓ		19.0		16.9 (-11.)	18.3 (-3.7)		
Acceleration 0-100 kph, sec			6.8	—	6.7	7.1		
Driveability Ratio Incl. Stall			1.0	—	0.8	1.2		
Driveability Ratio			1.0	—	1.7	1.2		

HONDA CB-360			Baseline Results	Test Results with Application of Control Measures (% change from baseline values in parentheses)				
Test Configuration		1978 Std.	Stock	Major Enleanment & CDI	+ Air Injection	+ Thermal Reactor	Lean Carburetor & CDI & Cat. & Air	Orig. Carb's. & CDI & Cat. & Air
FTP Results	HC, g/km	7.9	2.58	0.64 (-75.)	No FTP results - Ineffective control measure	0.37 (-86.)	Unable to perform due to carburetor degradation	0.34 (-87.)
	CO, g/km	17.	29.48	2.65 (-91.)		3.74 (-87.)		5.30 (-82.)
	NO_x, g/km		0.09	0.42 (+370)		0.31 (+240)		0.11 (+22.)
	Fuel, km/ℓ		24.7	32.1 (+30.)		29.2 (+18.)		20.3 (-18.)
FET Results	HC, g/km		0.72	0.27 (-62.)	No FET results - Ineffective Control measure	0.18 (-74.)	Unable to perform due to carburetor degradation	0.10 (-86.)
	CO, g/km		22.40	1.84 (-92.)		1.40 (-94.)		4.42 (-80.)
	NO_x, g/km		0.17	1.01 (+500)		0.80 (+370)		0.18 (+5.9)
	Fuel, km/ℓ		29.3	37.5 (+28.)		36.6 (+25.)		26.7 (-8.9)
Acceleration 0-100 kph, sec			9.0	10.0	—	17	—	14.6
Driveability Ratio Incl. Stall			1.0	0.5	—	2.3	5.5	1.6
Driveability Ratio			1.0	0.7	—	2.1	6.8	2.1

HONDA XL-125			Baseline Results	Test Results with Application of Control Measures (% change from baseline values in parentheses)				
Test Configuration		1978 Std.	Return to Stock[a]	Air Injection (Chevette Reed Valve)	Air Injection (Pump 1033 @ (1.2)[a]	Air Injection (Pump 1033 @ 1.33:2)	+ CDI and Minor Enleanment	+ Cat. w/Air (1533 @ 1.33:2) -CDI
FTP Results	HC, g/km	5.0	0.74	0.75 (+1.4)	0.63 (-15.)	0.57 (-23.)	0.52 (-30.)	0.10 (-86.)
	CO, g/km	17.	13.35	14.97 (+12.)	12.77 (-4.3)	9.98 (-25.)	7.15 (-46.)	0.85 (-94.)
	NO_x, g/km		0.16	0.12 (-25.)	0.14 (-12.)	0.13 (-19.)	0.16 (0)	0.17 (+6.3)
	Fuel, km/ℓ		37.2	38.4 (+3.2)	40.2 (+8.1)	40.3 (+8.3)	38.0 (+2.2)	40.2 (+8.1)
FET Results	HC, g/km		0.56	0.50 (-11.)	0.45 (-20.)	0.39 (-30.)	0.24 (-57.)	0.03 (-95.)
	CO, g/km		8.82	9.55 (+8.3)	11.45 (+30.)	9.21 (+4.4)	6.00 (-32.)	1.24 (-86.)
	NO_x, g/km		0.64	0.78 (+22.)	0.70 (+9.4)	0.74 (+16.)	0.59 (-7.8)	0.81 (+27.)
	Fuel, km/ℓ		35.3	36.1 (+2.3)	35.6 (+0.8)	36.5 (+3.4)	33.8 (-4.2)	35.0 (-0.8)
Acceleration 0-80 kph, sec			10.2	—	—	11.8	11.5	11.8
Driveability Ratio Incl. Stall			1.0	—	—	0.4	0.3	0.5
Driveability Ratio			1.0	—	—	0.5	0.6	1.1

[a] Values shown are based on one run

[b] W.O.T. acceleration 0-80 kph; motorcycle could not reach 100 kph

[c] Motorcycle could not reach 80 kph

TABLE 2 (cont'd). SUMMARY OF EMISSION RESULTS FOR 2-STROKE MOTORCYCLES

SUZUKI GT-750			Baseline Results	Test Results with Application of Control Measures (% change from baseline values in parentheses)				
Test Configuration		1978 Std.	Stock	Minor Enleanment & CDI	+ Spark Ignited Afterburner	+ Air Injection	+ Catalyst & Air Addition	
FTP Results	HC, g/km	14.	14.12	12.75 (-9.7)	No FTP results ineffective control measure	No FTP results ineffective control measure	1.42 (-90.)	
	CO, g/km	17.	12.07	5.38 (-55.)			0.75 (-94.)	
	NO_x, g/km		0.03	0.04 (+33.)			0.06 (+100)	
	Fuel, km/ℓ		17.3	18.7 (+8.1)			20.4 (+18.)	
FET Results	HC, g/km		8.07	4.4 (-46.)	No FET results ineffective control measure	No FET results ineffective control measure	0.57 (-93.)	
	CO, g/km		8.93	1.11 (-88.)			0.18 (-98.)	
	NO_x, g/km		0.04	0.10 (+150)			0.09 (+130)	
	Fuel, km/ℓ		22.0	27.3 (+24.)			24.9 (+13.)	
Acceleration 0-100 kph, sec			6.4	6.3	—	—	8.6	
Driveability Ratio Incl. Stall			1.0	1.0	—	—	1.2	
Driveability Ratio			1.0	1.0	—	—	1.2	

KAWASAKI KH-500			Baseline Results	Test Results with Application of Control Measures (% change from baseline values in parentheses)				
Test Configuration		1978 Std.	Stock	Catalyst & Port Liners	+ Minor Carburetor Enleanment	Catalyst & Port Liners (Repeat)	+ Minor Carburetor Enleanment (Repeat)	+ Air Addition
FTP Results	HC, g/km	10.	19.26	4.04 (-79.)	2.49 (-87.)	3.94 (-80.)	2.33 (-88.)	1.16 (-94.)
	CO, g/km	17.	26.25	28.59 (+8.9)	7.28 (-72.)	23.81 (-9.3)	9.69 (-63.)	1.49 (-94.)
	NO_x, g/km		0.02	0.01 (-50.)	0.05 (+150)	0.01 (-50.)	0.02 (0)	0.05 (+150)
	Fuel, km/ℓ		14.9	15.1 (+1.3)	18.9 (+27.)	17.2 (+15.)	18.9 (+27.)	18.9 (+27.)
FET Results	HC, g/km		10.41	2.89 (-72.)	0.55 (-95.)	2.89 (-72.)	0.74 (-93.)	0.27 (-97.)
	CO, g/km		26.35	26.35 (0)	1.09 (-96.)	26.27 (-0.3)	2.73 (-90.)	0.23 (-99.)
	NO_x, g/km		0.02	0.00 (-100)	0.16 (+700)	0.01 (-50)	0.04 (+100)	0.10 (+400)
	Fuel, km/ℓ		18.7	17.6 (-5.8)	24.8 (+30.)	19.8 (+5.8)	25.4 (+36.)	25.2 (+35.)
Acceleration 0-100 kph, sec			6.7	9.3	10.4	—	9.0	9.4
Driveability Ratio Incl. Stall			1.0	0.8	1.1	0.8	0.8	1.3
Driveability Ratio			1.0	0.8	1.0	1.1	1.5	1.3

YAMAHA RD-400			Baseline Results	Test Results with Application of Control Measures (% change from baseline values in parentheses)				
Test Configuration		1978 Std.	Stock	Catalyst & Air Injection (Pulsair)	Thermal Reactor & Air Injection			
FTP Results	HC, g/km	8.5	10.32	1.14 (-89.)	No FTP results ineffective control measure			
	CO, g/km	17.	12.62	2.85 (-77.)				
	NO_x, g/km		0.03	0.02 (-33.)				
	Fuel, km/ℓ		21.3	23.1 (+8.5)				
FET Results	HC, g/km		4.79	0.46 (-90.)	No FET results ineffective control measure			
	CO, g/km		10.72	4.89 (-54.)				
	NO_x, g/km		0.04	0.02 (-50.)				
	Fuel, km/ℓ		26.9	26.4 (-1.9)				
Acceleration 0-100 kph, sec			7.6	8.0	—			
Driveability Ratio Incl. Stall			1.0	0.5	0.8			
Driveability Ratio			1.0	0.7	1.4			

KAWASAKI KE-175			Baseline Results	Test Results with Application of Control Measures (% change from baseline values in parentheses)				
Test Configuration		1978 Std.	Stock	Rotary Valve Mod.[a] (20° Red. of Cut Angle)	Rotary Valve Mod.[a] (10° Red. of Cut Angle)	Minor Carburetor Enleanment	+ Catalyst & Air Addition (Pump 0533)	+ Additional Air Air Added (Pump 1033)
FTP Results	HC, g/km	5.1	7.48	6.95 (-7.1)	7.12 (-4.8)	4.77 (-36.)	1.85 (-75.)	1.74 (-77.)
	CO, g/km	17.	24.16	24.32 (+0.7)	24.53 (+1.5)	5.24 (-78.)	7.46 (-69.)	6.88 (-72.)
	NO_x, g/km		0.02	0.02 (0)	0.02 (0)	0.05 (+150)	0.03 (+50.)	0.05 (+150)
	Fuel, km/ℓ		24.2	25.1 (+3.7)	24.3 (+0.4)	33.0 (+36.)	31.0 (+28.)	33.0 (+36.)
FET Results	HC, g/km		6.48	7.77 (+20.)	6.93 (+6.9)	4.17 (-36.)	2.72 (-58.)	2.01 (-69.)
	CO, g/km		34.24	42.32 (+24.)	37.97 (+11.)	11.69 (-66.)	19.73 (-42.)	14.90 (-56.)
	NO_x, g/km		0.03	0.02 (-33.)	0.02 (-33.)	0.10 (+220)	0.03 (0)	0.07 (+130)
	Fuel, km/ℓ		21.5	18.8 (-13.)	19.9 (-7.4)	29.1 (+36)	23.6 (+10.)	26.5 (+23)
Acceleration 0-100 kph, sec			16.6	27	18.0	17.0	23.1[b]	22.7[b]
Driveability Ratio Incl. Stall			1.0	1.2	1.0	1.3	1.2	1.6
Driveability Ratio			1.0	1.1	0.9	1.0	1.1	1.6

SUZUKI TS-100			Baseline Results	Test Results with Application of Control Measures (% change from baseline values in parentheses)				
Test Configuration		1978 Std.	Return to Stock[a]	Rotary Valve Mod.[a] (20° Red. of Cut Angle)	Rotary Valve Mod.[a] (10° Red. of Cut Angle)	Minor Enleanment & CDI	+ Catalyst (Modified) & Air Addition	
FTP Results	HC, g/km	5.0	4.23	4.45 (+5.2)	4.53 (+7.1)	4.71 (+11.)	1.19 (-72.)	
	CO, g/km	17.	8.09	8.94 (+10.)	8.47 (+4.7)	1.70 (-79.)	0.93 (-88.)	
	NO_x, g/km		0.02	0.02 (0)	0.03 (+50)	0.07 (+250)	0.10 (+400)	
	Fuel, km/ℓ		38.8	36.0 (-7.2)	36.6 (-5.7)	38.9 (+0.3)	35.6 (-8.5)	
FET Results	HC, g/km		5.52	7.01 (+27.)	7.42 (+34.)	3.59 (-35.)	1.67 (-70.)	
	CO, g/km		16.85	27.00 (+60.)	27.82 (+65.)	1.10 (-94.)	16.48 (-2.2)	
	NO_x, g/km		0.07	0.04 (-43.)	0.05 (-29.)	0.17 (+140.)	0.05 (-29.)	
	Fuel, km/ℓ		29.3	23.9 (-18.)	22.8 (-22.)	41.4 (+41.)	29.4 (+3.4)	
Acceleration 0-80 kph, sec			20.6	24.5	23.8	19.9	(0-70 kph) 22[c]	
Driveability Ratio Incl. Stall			1.0	—	1.1	1.4	1.7	
Driveability Ratio			1.0	—	1.1	1.3	1.6	

emission tests were performed. Major enleanment was performed on one motorcycle (Honda CB-360) by replacing the standard carburetors with others, utilizing an accelerator pump circuit. This move caused a large reduction in HC and CO and increased fuel economy, with only a marginal drop in performance. Capacitive-discharge ignition systems were used in conjunction with lean carburetion to provide improved combustion reliability and consequently more efficient idle and high speed operation. Although high-intensity spark systems contributed to emissions reduction by firing lean mixtures, they were not a control measure in themselves, but rather a necessity for leaner operation. Proprietary improvements in carburetion and intake mixing may effectively reduce emissions of HC and CO to levels within the 1980 standards without appreciable driveability degradation.

Exhaust air injection was used on several of the test motorcycles, yielding emission control in some cases by oxidizing the hot gases leaving the exhaust port area. These exhaust oxidations were noted at various speeds on some motorcycles but did not occur on others. Air was generally injected through sparger tubes protruding into the exhaust port head cavity. In most cases, it was necessary to pump the air into the system using oiless carbon vane pumps. Pump sizes depended on results obtained during steady-state testing, which indicated air injection rate thresholds that had to be reached before exhaust reaction would occur. These thresholds varied with exhaust mixture and temperature changes at different speeds and loads. Air induction reed valves ("pulsair") were applied in some cases, but they usually did not provide enough air at the higher speeds where exhaust heat provided better conditions for exhaust oxidation. In some respects, the air injected into the exhaust system simulated thermal reactor operation.

Only a few thermal reactors were used in the program. Their design was largely based on reference material available for automotive type reactors. Thermal reactors and air addition applied to 4-stroke motorcycles showed some emission improvement, but this improvement was difficult to assess because of possible emission changes resulting from backpressure modification. Retarding of timing did increase exhaust reactions in 4-stroke motorcycles, but no transient tests were run with retarded timing influences. Attempts to use thermal reactors on 2-stroke machines were ineffective due to the 2-stroke's relatively low exhaust gas temperatures and its exhaust "tuning" sensitivity.

Oxidation catalysts were applied to several of the test motorcycles yielding significant reduction in HC and CO emissions. Most of the catalysts supplied for the project were of the monolithic type, except for two supplied specifically for the Yamaha RD-400 (2-stroke) which were of a "silca-cloth" type. Although the catalysts were generally used in conjunction with air injection by pump or "pulsair", some testing was conducted with only the catalyst added to the previous control measure. In application of catalysts without air addition, 4-stroke HC and CO emissions were both reduced; while reduction of 2-stroke HC emission was usually accompanied by an increase in CO. The addition of air ahead of the catalyst improved catalyst efficiency in all cases, especially for 2-stroke applications. The most efficient quantity of air injection was determined by the degree of change in HC and CO, principally where CO was significantly reduced after HC oxidation. Relatively small quantities of air were needed in most cases, due to carburetor enleanment preceding catalyst application. Excessive air addition not only caused higher catalyst temperatures, but also increased NO_x emissions. Oxygen deficiency led to a reducing atmosphere, however, which decreased NO_x.

The relatively compact cylindrical catalyst assemblies (7 to 10 cm diameter by 10 to 13 cm long from Engelhard Industries) were positioned in the exhaust pipes far enough downstream of the exhaust port to reduce acoustic effects but close enough to insure reasonably short "light-off" time. These positions were selected on the basis of exhaust pipe muffler configurations and control pedal positions, so the catalysts were usually located either adjacent to the engine or next to the operator foot pegs. During road evaluations and other testing, heat from the catalyst was noticed by the riders. The problem was not severe during test work, but proprietary efforts toward head-shielding and/or catalyst repositioning would be needed for production machines. An example of such efforts was the catalyst-muffler weldments supplied for use on the RD-400 by Matsushita Electric Industrial Company. Catalyst addition caused only minor degradation in performance of the 4-stroke motorcycles; but the degradation in performance was more severe for the 2-stroke motorcycles, particularly the two of smaller displacement. It is assumed that the problems encountered with the two smaller 2-stroke motorcycles were due to increased backpressure resulting from higher exhaust mass flow per catalyst unit volume and to acoustic "detuning" effects.

Rotary valve modifications made on the two smallest 2-stroke motorcycles showed no advantage in emission reduction, although changes in performance were comparatively large for the type of change made during this program. Spark-ignited afterburning was applied to the 2-stroke GT-750, but no overscavenged exhaust mixtures were ignited reliably.

An initial experiment to extract overscavenged fuel-air mixture from the 2-stroke Kawasaki KE-175 was performed using a timed rotary extraction valve and a small pump. The results indicated that the fuel-air mixture was selectively removed from the main exhaust stream to some extent. Ideally, continued experimentation with such a system might lead to worthwhile improvements in 2-stroke hydrocarbon emissions and fuel economy.

In addition to this project, a relatively simple investigation was made into the effects of maladjusting carburetion or timing. Discussion and results of this additional study are given in Section VI.

III. MOTORCYCLE SELECTION METHODOLOGY

This section details the methodology used in the selection of the ten motorcycles that were tested. Motorcycle selection was of great importance, because the usefulness of the data to be obtained depended on the motorcycles selected. The selection criteria were based primarily on motorcycle population trends, motorcycle sizes, and variations in engine design.

Referring to the Work Plan for this contract, the initial selection plan included motorcycles from the categories described in Table 3. This general plan was followed because it represented the range of motorcycles available quite well. It also stressed the larger machines having relatively high mass emissions, urban usage, and total annual distance traveled per unit compared to motorcycles as a whole.

TABLE 3. DESIRED SELECTION CATEGORIES

Number	Displacement, cm^3	Type	Cooling
1	over 500	2-s	air
1	over 500	2-s	water
1	over 500	4-s	air
1	over 500	4-s	water
1	300 to 500	2-s	air
1	300 to 500	4-s	air
1	300 to 500	rotary	water
2	under 300	2-s	air
1	under 300	4-s	air

As shown in Tables A-1 through A-5 of Appendix A, there were nearly 120 motorcycle models available in 1976 which were full size and street-legal. This multiplicity of models made the selection task difficult, but a great many models were easily eliminated from consideration to make it more manageable. Table 4 shows the result of initial eliminations, bringing the total number of models considered down to half the original group. Registration data used to make the judgment explained in footnote b were compiled by R. L. Polk and supplied to the project by the Motorcycle Industry Council (MIC).(2)

The 59 motorcycle models left for consideration were broken down further by type and cooling medium in Table 5 (motorcycle displacement "category" is defined in Table 4). Although the contract had previously considered machines under 300 cm^3 displacement as one group, they were broken into three separate categories for the purpose of motorcycle selection due to the variety of under 300 cm^3 models available. This finer breakdown did not affect the number of machines chosen, but it made the selection process more understandable.

Three of the motorcycle choices were made quite simply because only one motorcycle produced at the time fell into each of the three categories. These choices were:

TABLE 4. INITIAL MOTORCYCLE MODEL ELIMINATION PROCESS

Motorcycle "Category"	Displacement = D, cm^3	Class total	Totals after successive elimination of models having Engine duplicates	Obselete and limited[a] prod.	Insignificant registrations[b]
A	$50 \leq D \leq 100$	15	11	11	7
B	$100 < D \leq 170$	16	13	12	7
C	$170 < D < 300$	31	26	24	15
D	$300 \leq D \leq 500$	23	21	20	16
E	$500 < D$	33	26	22	14
Totals		118	97	89	59

[a] intentionally limited production
[b] not likely to exceed 3000 U.S. registrations in 1976

TABLE 5. POSSIBLE TEST MOTORCYCLE GROUPS BY DISPLACEMENT, TYPE, COOLING MEDIUM, AND CYLINDERS OR ROTORS

"Category"	Category pop.	Air-cooled 2-stroke			Air-cooled 4-stroke				Water-cooled		
		1cyl	2cyl	3cyl	1cyl	2cyl	3cyl	4cyl	rotary	2s	4s
A	7	5	-	-	2	-	-	-	--	--	--
B	7	5	1	-	1	-	-	-	--	--	--
C	15	9	3	1	1	1	-	-	--	--	--
Subtotal A-C	29	19	4	1	4	1	-	-	--	--	--
D	16	2	3	2	2	5	-	1	1(1 rot.)	--	--
E	14	--	-	1	-	6	1	4	--	1(3 cyl)	1(4 cyl)

water-cooled	2-stroke over 500 cm^3	Suzuki GT-750
water-cooled	4-stroke over 500 cm^3	Honda GL-1000
water-cooled	rotary 300-500 cm^3	Suzuki RE-5

As a matter of fact, these three motorcycles were the only water-cooled models in production, regardless of size or type. A fourth category was also handled quite briefly, namely 2-stroke air-cooled machines over 500 cm^3. The only model fitting this description was the Suzuki GT-550 "Indy", but two other machines were available with 500 cm^3 displacements (Kawasaki KH-500 and Suzuki GT-500 "Titan"). The GT-500 was of a relatively old design and it was considered likely to be phased out before the other two, thus it was not chosen. The GT-550 would have been the logical choice, except that we would then have had both of the largest 2-strokes and the rotary by the same manufacturer, which we considered to be undesirable if we were really to assess a variety of control approaches. The Kawasaki KH-500 was thus chosen for testing even though it did not quite make it into the "over 500 cm^3" category.

The next category studied was the group of air-cooled 4-strokes over 500 cm^3, which was very important relative to other motorcycle categories due to large population, potential for large mass emissions, and high urban and rural annual distance figures. The 11 motorcycle models which constituted this category (from Table 5) are listed in Table 6 for reference. All these motorcycles were for street usage only, so vehicle type was not a factor in the choice. Using the projected 1976 registrations, the following statistics were computed:

weighted median displacement = 736 cm^3
weighted mean displacement = 792 cm^3
weighted mean vehicle weight = 225 kg

TABLE 6. AIR-COOLED 4-STROKE MOTORCYCLES OVER 500 cm^3

Manufacturer	Model	Displ., cm^3	Cyls	Vehicle wt., kg	Projected 1976 Reg's[a]
BMW	R90	898	2	215	5,000
AMF/Harley-Davidson	XL-1000	995	2	212	20,000
AMF/Harley-Davidson	FL/FX-1200	1207	2	327/246	20,000
Honda	CB550/550F	544	4	192/191	35,000
Honda	CB750/750F	736	4	217/226	50,000
Honda	CB750A	736	4	247	20,000[b]
Kawasaki	KZ750	746	2	224	15,000[b]
Kawasaki	KZ900/900LTD	903	4	233/236	25,000
Norton	850R/I	828	2	209/212	5,000
Yamaha	XS650	653	2	212	12,000
Yamaha	XS750	747	3	229	20,000[b]

[a] projected from 1975 R. L. Polk data
[b] new model, 1975 registrations incomplete or non-existent

Not surprisingly, the model which fit the above statistics best was the Honda CB-750/750F; and it also had the largest projected 1976 registrations (approximately 52,000 registrations in 1975). Another contender for use in this category was the Kawasaki KZ-900/900 LTD, which was very popular and represented the newest fully market-tested design in the category; and the Norton, BMW, and two AMF/Harley-Davidsons were representative of older technology (Norton and BMW also had very low registrations). While the Yamaha XS-750 was highly innovative, it had not been tested for buyer acceptance, making it a somewhat risky choice. The Yamaha XS-650 was a relatively old design concept, and the Honda CB-750A (automatic transmission) had an unknown market potential.

As a result of these discussions of pros and cons, the only two reasonable choices in this category were the Honda CB-750/750F and the Kawasaki KZ-900/900 LTD. Because it was considered desirable to avoid testing more than one motorcycle by a single manufacturer in the same general size range, the Kawasaki KZ-900 was selected.

The five largest motorcycles having been chosen, consideration was given to "category D", 2-stroke machines. Candidates in this category (300 cm^3 < displacement < 500 cm^3) are listed in Table 7. For a number of reasons, the Yamaha RD-400C was the standout in this group, including popularity (the 1976 projection was substantiated by popularity of the previous 350 cm^3 model and the exceptional reviews the RD-400C had received from the motorcycle press), technical sophistication, and its 2-cylinder configuration. The larger 2-stroke machines (already selected) were both triples, and it seemed very likely that all 2-stroke machines below 300 cm^3 selected for testing would be singles; so it was important to select a twin in this 300-500 cm^3 category. The reed valve induction system of the RD-400C was also of technical interest, because it was considered to have a potential influence on emissions. The Yamaha RD-400C was thus selected for testing as the representative of "categroy D" 2-strokes.

A number of motorcycle models were available in the 300-500 cm^3 category of 4-strokes, and they are listed in Table 8. Not counting the street/trail machines, which have comparatively few total registrations, this displacement grouping was popularized by the now-obsolete Honda 350. The Honda 350 remained the largest-selling motorcycle model at the time selections were made, and the newer 360 seemed to be following the same general course with regard to sales. The 360 Honda now had 4-stroke competition in the form of Kawasaki's established KZ-400 and Yamaha's new XS-360C which the older 350 did not have, but it still seemed to be selling extremely well.

Efforts to represent this category centered immediately on three 2-cylinder machines (Honda 360, Kawasaki 400, Yamaha 360) due to the sheer weight of their total sales and their general good representation of the category. Yamaha's XS-360C, while potentially popular, was eliminated on the basis of unproven sales, leaving the KZ-400 and CB-360 to choose from. In this case, the Honda CB-360T was chosen due to the weight of its popularity.

In the category of machines having displacements under 300 cm^3, the street/trail variety was more popular than pure street machines. Light weight and simplicity are very important to popularity of small street/trail motorcycles, so the 2-stroke engine powered a substantial majority of such machines in use.

TABLE 7. AIR-COOLED 2-STROKE MOTORCYCLES WITH DISPLACEMENTS OF 300-500 cm^3

Manufacturer	Model	Type	Displ., cm^3	Cyls	Vehicle wt., kg	Projected 1976 Reg's[a]	Features
Kawasaki	KH400	S	400	3	162	6,000[b]	38 hp @ 7000
Suzuki	GT380	S	371	3	171	8,000	"ram air" cooling
Suzuki	TS400	S/T	396	1	124	7,000	
Yamaha	RD400C	S	398	2	166	15,000[b]	reed valve, 38 hp @ 7000
Yamaha	DT400C	S/T	397	1	123	8,000[b]	reed valve, 27 hp @ 5000

[a] projected from 1975 R. L. Polk data
[b] very uncertain due to multiple models registered at this displacement

TABLE 8. AIR-COOLED 4-STROKE MOTORCYCLES WITH DISPLACEMENTS OF 300-500 cm^3

Manufacturer	Model	Type	Displ., cm^3	Cyls	Vehicle wt., kg	Projected 1976 Reg's[a]	Features
Honda	XL350	S/T	348	1	142	13,000	4-valve head
Honda	CB/CJ 360T	S	356	2	159/165	45,000	SOHC
Honda	CB400F	S	408	4	170	10,000	SOHC
Honda	CB500T	S	498	2	193	10,000	DOHC
Kawasaki	KZ400	S	398	2	172	25,000	SOHC, 36 hp @ 8500
Yamaha	XS360C	S	359	2	159	20,000[b]	DOHC
Yamaha	XS500C	S	498	2	192	10,000[b]	DOHC
Yamaha	XT500C	S/T	499	1	137	10,000[b]	SOHC, 30 hp @ 5800

[a] projected from 1975 R. L. Polk data
[b] relatively new model, 1975 registrations incomplete or non-existent

Although a few motorcycles were offered with other displacements, most of the bikes in this category were 250s, 175s, 125s, or 100s. Models falling into previously-defined "category C" (170 cm^3 < displacement < 300 cm^3) are tabulated in Table 9. Our contention was that one motorcycle should be selected from this group, leaving two choices at the low end of the size spectrum (100 and 125 cm^3) due to the unique problems anticipated in adapting controls to them.

The weighted mean displacement of the models listed in Table 9 was about 214 cm^3, virtually midway between the 175s and the 250s. Single-cylinder street/trail models were obviously the most popular motorcycle type in "category C". Redefining the limits on our choice to include only 2-stroke singles of the street/trail type, eight possibilities still remained. The sales standout appeared to be the Yamaha DT-250C, and four other models had projected 1976 registrations which were somewhat lower and about equal to each other. Due to the weight of numbers, however, the DT-250C appeared to be the most representative choice from this class.

TABLE 9. AIR-COOLED MOTORCYCLES WITH DISPLACEMENTS BETWEEN 170 AND 300 cm^3

Mfgr.	Model	Type	Engine Displ., cm^3	Cyls	Vehicle Type	Vehicle wt., kg	Projected 1976 Reg's[a]	Features
AMF/H-D	SS/SX-175	2s	174	1	S-S/T	116/112	4,000	
AMF/H-D	SS/SX-250	2s	242	1	S-S/T	118/114	5,000	
Honda	XL-175	4s	173	1	S/T	108	12,000	
Honda	CB-200T	4s	198	2	S	132	12,000	
Honda	XL-250	4s	248	1	S/T	136	10,000[b]	4-valve head
Honda	MT-250	2s	248	1	S/T	118	10,000[b]	
Kawasaki	KE175	2s	174	1	S/T	105	10,000	rotary valve, 16 hp @ 7000
Kawasaki	KH250	2s	249	3	S	158	10,000	28 hp @ 7500
Suzuki	GT-185	2s	184	2	S	115	6,000[b]	
Suzuki	TS/TC-185	2s	183	1	S/T	97	10,000[b]	
Suzuki	GT-250	2s	247	2	S	146	5,000[b]	
Suzuki	TS-250	2s	246	1	S/T	109	8,000[b]	
Yamaha	DT175C	2s	171	1	S/T	100	10,000	reed valve, 16 hp @ 7500
Yamaha	RD200C	2s	195	2	S	116	3,000	reed valve, 22 hp @ 7500
Yamaha	DT250C	2s	246	1	S/T	121	18,000	reed valve, 21 hp @ 6000

[a] projected from 1975 R. L. Polk data
[b] very uncertain due to multiple models at this displacement

The final motorcycle choices were those in the previously-defined "categories A and B" (50 cm^3 < displacement < 170 cm^3), one 2-stroke, and one 4-stroke. The models then available in this size range are tabulated in Table 10, and it appeared that the street/trail models were most representative of

TABLE 10. AIR-COOLED MOTORCYCLES WITH DISPLACEMENTS FROM 50-170 cm^3

Engine Type	Manufacturer	Model	Engine		Vehicle		Projected	Features
			displ., cm^3	cyls	type	wt., kg	1976 Reg's.[a]	
2s	AMF/H-D	SS/SXT-125	123	1	S-S/T	109/105	4,000	
	Honda	MT-125	123	1	S/T	94	7,000[b]	
	Kawasaki	KH/KE/KV-100	99	1	S-S/T-S/T	85/91/97	16,000[b]	rotary valve, 10.5-11 hp @ 7500
	Kawasaki	KE125	124	1	S/T	98	7,000	rotary valve, 13 hp @ 6500
	Suzuki	A-100	98	1	S	83	3,000[b]	rotary valve
	Suzuki	TS/TC-100	98	1	S/T	92/93	7,000[b]	rotary valve
	Suzuki	TS/TC-125	123	1	S/T	90/95	10,000	
	Yamaha	RS-100C	97	1	S	89	4,000[b]	reed valve, 10.5 hp @ 8000
	Yamaha	DT-100C	97	1	S/T	93	8,000[b]	reed valve, 10 hp @ 7500
	Yamaha	RD-125C	124	2	S	103	4,000[b]	reed valve, 16 hp @ 9500
	Yamaha	DT-125C	123	1	S/T	104	8,000[b]	reed valve, 13 hp @ 7000
4s	Honda	CT-90	90	1	S/T	90	10,000	
	Honda	XL-100	99	1	S/T	93	9,000	
	Honda	CB/XL-125	124	1	S-S/T	93/99	20,000[b]	

[a] projected from 1975 R. L. Polk data

[b] individual models very uncertain due to multiple models at this displacement

their classes and types. Regarding 2-stroke models already tentatively chosen, we had two with piston port-controlled inlets and two with reed valves. It thus seemed logical to choose a rotary-valve machine in this category, and the one model with the best apparent sales potential was the Kawasaki KE-100 (same as KV-100, except that the KV had a dual-range transmission). Choices among the 4-strokes were quite limited, and it seemed that the Honda XL-125 was the obvious choice due to its history of popularity.

A list of 10 motorcycles recommended for test purposes was submitted to the Project Officer, and eight of these recommendations were accepted. The list chosen by the Project Officer included a Kawasaki KE-175 in place of the Yamaha DT-250C and a Suzuki TS-100 in place of the Kawasaki KE-100. The reasons for these changes were understood to be inclusion of an additional rotary-valve machine (KE-175) and a brand switch to the Suzuki TS-100 to keep from having an inordinately large number of Kawasaki motorcycles in the program. Table 11 is a list of the final test motorcycle selections.

Following confirmation of the test motorcycle selections on May 17, 1976, the Project Officer began to solicit them on a gratis basis from MIC and then from individual manufacturers. Arrangements were made with Suzuki, Yamaha, and Honda to obtain test motorcycles on a gratis basis. Contact was made via letter to Kawasaki Motors Corporation, U.S.A. regarding purchasing details on a "V.I.P. sale" basis for three motorcycles. All 10 test motorcycles were received during July 1976.

TABLE 11. LIST OF TEST MOTORCYCLES, CONTRACT NO. 68-03-2391

Type	Model	displ., cm^3	Description	Cyl(s)	Carb(s)	Exh(s)	Ignition	Weight, kg	Cooling
2-stroke	Suzuki GT-750	738	piston port	3	3-40 Mik.	3	Batt. & Coil	230	water
	Kawasaki KH-500	498	piston port, 52 hp @ 7000	3	3-28 Mik.	3	Magneto CDI	192	air
	Yamaha RD-400C	398	reed valve, 38 hp @ 7000	2	2-28 Mik.	2	Batt. & Coil	166	air
	Kawasaki KE-175	174	rotary valve, 16 hp @ 7000	1	1-26 Mik.	1	CDI	105	air
	Suzuki TS-100	98	rotary valve	1	1-19 Mik.	1	Magneto	92	air
4-stroke	Honda GL-1000	999		4	4-32 Kei.	4-1	Batt. & Coil	264	water
	Kawasaki KZ-900	903	76 hp @ 8500	4	4-26 Mik.	4	Batt. & Coil	233	air
	Honda CB-360T	356		2	2-30 Kei.	2	Batt. & Coil	165	air
	Honda XL-125	124		1	1-24 Kei.	1	Batt. & Coil	99	air
rotary	Suzuki RE-5	497		1 rot.	1-32 Mik.	1-2	CDI	245	water

IV. PREPARATION FOR CONTROL APPLICATION

This section begins with a brief description of the test equipment used for data acquisition followed by procedures and results for zero-distance emission tests, break-in operation, and baseline emissions tests. Performance and driveability evaluation methods are also discussed.

A. Test Equipment

All emission testing during this project was performed on a single-roll dynamometer having a roll diameter of 529.2 mm. Power absorption was provided by a Clayton 50 hp water brake absorber from a model ECE-50 assembly driven directly by the roll shaft. A modified Clayton inertia system provided variable inertia simulation within a ± 3 kg tolerance. Power absorption (load) and speed were read from digital indicators during steady-state testing, and a strip-chart driver's aid was used for transient cycle testing.

Control settings for the dynamometer were determined from calibration data to provide the necessary power absorption and inertia settings for the ten motorcycles. These settings were based on loaded vehicle mass per the tabulation in 86.529-78 of the Federal Register.(1) In order to document the characteristics of the dynamometer system used for this project, a thorough calibration was conducted. This calibration confirmed that our system provided a close approximation of the speed-load characteristics suggested by EPA for motorcycle emissions work. Data acquired during coast-down operation at three inertia settings and at mean speeds from 90 to 20 kph were fit by curves of the form

$$\text{power} = cV + dV^3,$$

which is the same form recommended by EPA. Table 12 gives a summary of the coefficients of this equation for the three inertia settings tested. The highest and lowest inertia values correspond to loaded masses of the heaviest and lightest motorcycles tested in this project, the Honda GL-1000 and the Suzuki TS-100, respectively.

TABLE 12. COEFFICIENTS OF BEST FIT POWER EQUATIONS

Inertia, kg	"V" coefficients = c	"V^3" coefficients = d	r^2
176	0.00728	5.63×10^{-6}	0.9983
254	0.00763	6.59×10^{-6}	0.9995
352	0.01126	7.03×10^{-6}	0.9986

Checking the force (calculated using equations defined by Table 12) at 65 kph against that calculated by the EPA equation yields the following comparison:

Inertia kg	EPA Equation	SwRI Dynamometer
176	110.2 N	111.8 N
254	126.1 N	127.8 N
352	146.0 N	147.5 N

Thus, for the range of inertia values used in this project, the SwRI dynamometer was well within the ± 5 Newton tolerance on driving force at 65 kph which is specified in the regulations.

Cooling air over the motorcycle was provided in proportion to simulated road speed by a variable-output blower and an automatic control system. Figure 1 shows that the amount of cooling air supplied was within EPA requirements as given in the Federal Register, Section 86.508-78(d).(1) The cooling air calibration curve was obtained by measuring the air velocity with a pitot tube in the exit plane of the blower duct. The 72 cm x 67 cm rectangular exit plane was divided into nine equal areas and the velocity at the center of each area was determined. These individual velocities were averaged to obtain a mean exit velocity corresponding to a given dynamometer roll speed. The overall layout of the dynamometer and cooling air system are shown in Figure 2.

All emission testing was conducted using a Constant Volume Sampler (CVS) for bag collection and/or removal of exhaust from the laboratory. Continuous dilute emissions were sampled just upstream of the CVS sample probe. Steady-state undiluted emissions were sampled as close to the exhaust outlet as practical or just after multiple exhausts were combined into one stream. To reduce the possible influence of 2-stroke oil residue on emission sample collection, separate CVS's were used during the project for 4-stroke and for 2-stroke motorcycles. Using periodic propane checks to verify CVS calibration, the 2-stroke CVS required cleaning of intake plumbing twice during the program as a result of oily deposits accumulated after approximately 100 hr of operation.

Instrumentation used to measure concentrations of exhaust constituents is shown in Figures 3 and 4. Exhaust constituents measured were total hydrocarbons by FID, NO and NO_x by chemiluminescence, CO and CO_2 by NDIR, and O_2 by electrochemical analyzer. The "bag cart" in Figure 3 was used to measure concentrations in the dilute gases collected in bags during all the motorcycle FTPs and FETs. These instruments were essentially duplicated in the "bike cart", as shown in Figure 4, to determine CVS-diluted concentrations on a continuous basis during transient cycle operation. This same instrumentation was also used to measure concentrations in raw exhaust gases generated during steady-state operation. Recordings of data were made via a 6-channel strip chart recorder.

Temperature data were taken by thermocouples positioned along the exhaust pipe to provide information for catalyst selection, pinpointing of exhaust reactions, and engine monitoring. Up to 12 chromel-alumel (K-type) thermocouples were installed on each motorcycle. The extreme right side of the exhaust pipe on single cylinder engines was instrumented, with the first thermocouple station approximately 2.5 cm downstream of the pipe end attached to the head. The second temperature station was located approximately 10 cm

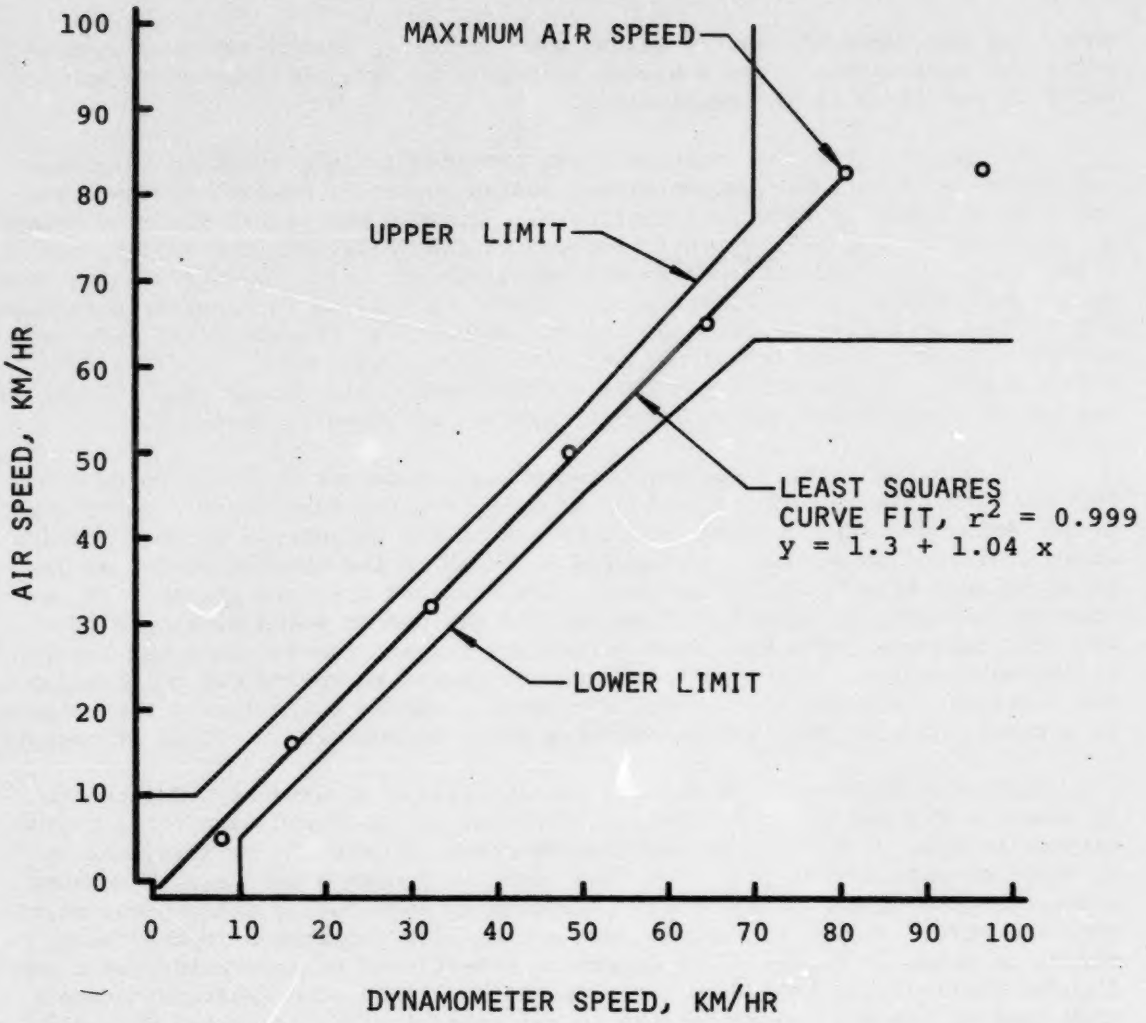


FIGURE 1. MOTORCYCLE COOLING BLOWER CALIBRATION

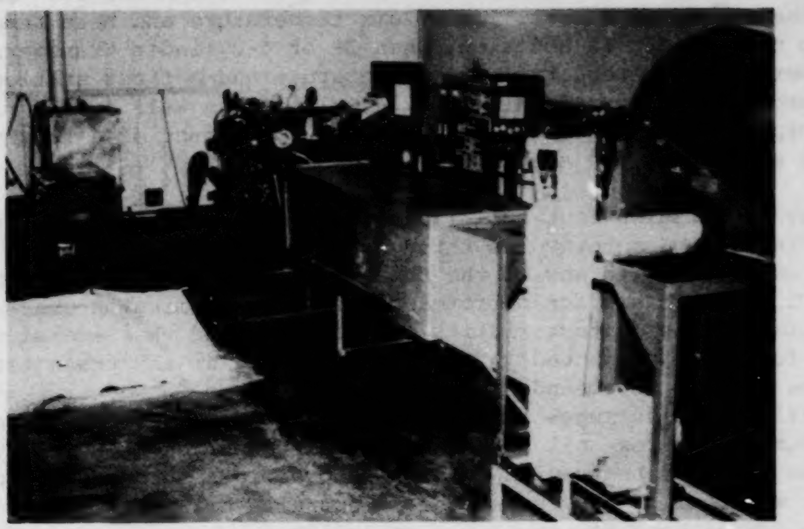


FIGURE 2. MOTORCYCLE TEST FACILITY

FIGURE 3. "BAG CART" USED FOR MEASUREMENT OF BAG CONCENTRATION OF HC, CO, CO_2, AND NO_x

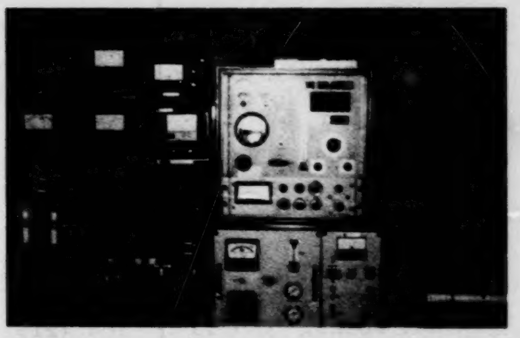


FIGURE 4. "BIKE CART" USED FOR MEASUREMENT OF BOTH DILUTED AND UNDILUTED EXHAUST EMISSIONS

further downstream; the third, another 15 cm downstream; the fourth, 20 cm further; and the fifth, another 25 cm further. The thermocouples after the fifth position were spaced 25 cm apart as required to complete the exhaust pipe length. The exhaust gas exit temperature station was located within 2 cm of the normal pipe exit. Inlet air temperature and head temperature were also monitored. In addition, when 3- or 4-cylinder transverse-mounted engines were encountered, the head temperature and a first station exhaust temperature were monitored on an inside cylinder as well as the right side exhaust pipe. Head temperature was taken by placement of a thermocouple between the spark plug and seat.

Unleaded emission test fuel (meeting Federal requirements for such fuel) was used in all the motorcycles throughout the project, providing the option of using catalysts with any of the test motorcycles. Using the same fuel also provided a common basis for performance as well as emission characterization. A tabulation of the characteristics of this fuel and the Federal specifications for such fuels are presented in Table 13. Crankcase and transmission lubricants were used as recommended by the manufacturers. Two-stroke engine oil was generally used as suggested; except that after baseline testing was completed, Yamaha 2-stroke oil was used at the suggestion of a catalyst manufacturer because their tests with this oil showed less tendency to poison the catalytic material.(3) By using the same engine oil in all the 2-stroke motorcycles, a common base for smoke was established.

TABLE 13. TEST FUEL SPECIFICATIONS

Fuel Type	Batch Used	Federal Specifications
SwRI Fuel Code	EM-259-F	--------------------
Gravity, °API	57.0	--------------------
Density, g/ml	0.751	--------------------
RVP, k Pa (psi)	60.7 (8.8)	55.2-63.4 (8.0-9.2)
Octane, Research	96.1	96 (Min.)
Sulfur, wt.%	0.002	0.10 (Max.)
Phosphorous, theory	0.0	0.0
Lead, g/l (g/gal)	0.001 (0.023)	0.000-0.013 (0.00-0.05) (Max.)
Aromatics, %	32.5	35 (Max.)
Olefins, %	4.4	10 (Max.)
Saturates, %	63.1	balance
IBP, °C (°F)	31 (88)	24-35 (75-95)
10% Point, °C (°F)	56 (132)	49-57 (120-135)
50% Point, °C (°F)	104 (219)	93-110 (200-230)
90% Point, °C (°F)	159 (319)	149-164 (300-325)
EP, °C (°F)	202 (396)	213 (415) Max.

B. Zero-Kilometer Testing

All ten motorcycles were received in a "roadable" condition as normally purchased from local distributors of the respective motorcycle manufacturers. The fuel systems were drained and refilled with unleaded emission test fuel. Zero-kilometer testing began following the addition of thermocouples and exhaust adapters for CVS hook-up. Figures 5 through 14 are arranged in order of increasing displacement and illustrate the motorcycles in their "green engine" test configurations.

FIGURE 5. SUZUKI TS-100

FIGURE 6. HONDA XL-125

Two FTPs and two FETs were performed on most of the motorcycles to establish "green engine" emissions and fuel economy. FETs (as given in the regulations) were not performed on those motorcycles which could not negotiate the test cycle without major violations of the manufacturer's suggested break-in procedures. Small-bike FTPs were conducted on the two Class I (under 170 cc) motorcycles, namely the Suzuki TS-100 and the Honda XL-125. Modified (experimental) FETs were run on the Honda XL-125. This experimental FET trace was run at 64 percent of standard speed throughout the test cycle. A summary of the results obtained from all the motorcycles tested in this configuration are given in Table 14. Run-to-run consistency was good in most cases, although an additional FTP was run on some motorcycles to provide satisfactory values of their hydrocarbon emissions.

All zero-kilometer testing was conducted using the upshift points specified in the Working Draft Emission Regulations, Section 86.528-78; but downshifting was performed at lower speeds than required by this section.(4) No shifting recommendations were given in the owner's manuals, so downshifting

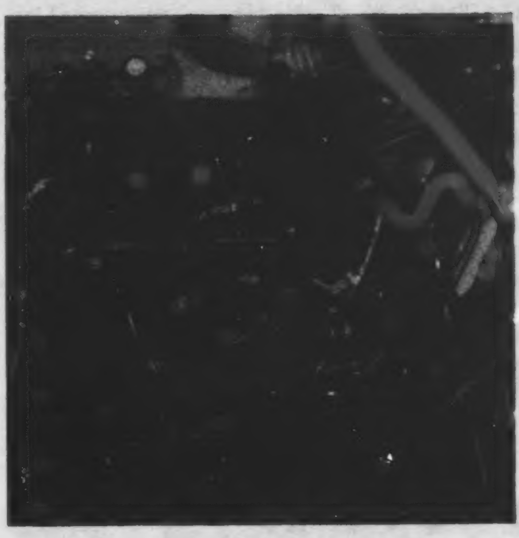


FIGURE 7. KAWASAKI KE-175

FIGURE 8. HONDA CB-360

FIGURE 9. YAMAHA RD-400

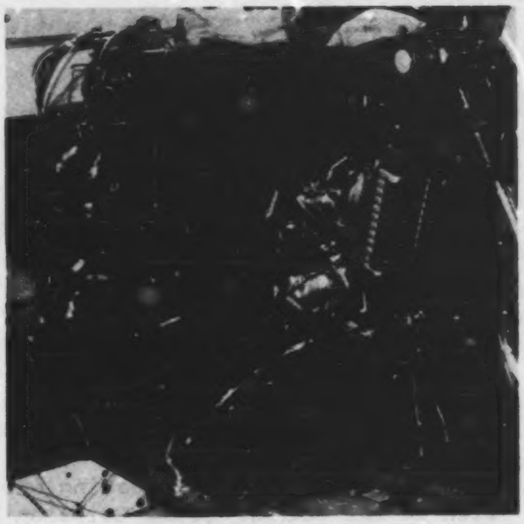


FIGURE 10. SUZUKI RE-5

FIGURE 11. KAWASAKI KH-500

FIGURE 12. SUZUKI GT-750

KAWASAKI
900

FIGURE 13. KAWASAKI KZ-900

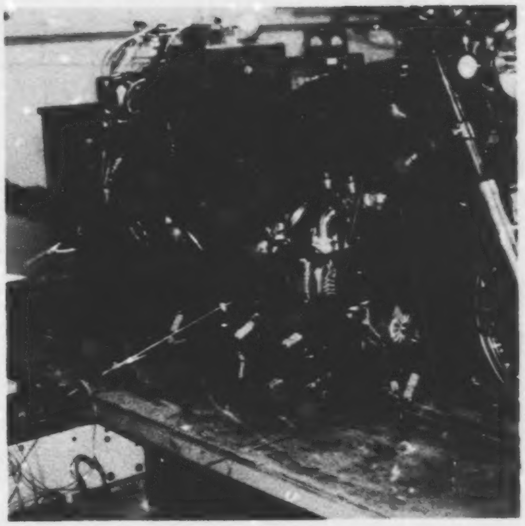


FIGURE 14. HONDA GL-1000

TABLE 14. SUMMARY OF ZERO KILOMETER (GREEN ENGINE) EMISSION TEST RESULTS

Motorcycle	Actual Displacement, cm^3	1978 HC Standard, g/km	Run	FTP Emissions, g/km				FTP Fuel, km/ℓ	FET Emissions, g/km				FET Fuel, km/ℓ
				HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Suzuki GT-750 3 cyl. 2-s	738	14.	1	16.70	19.34	63.30	0.01	16.1	8.29	11.12	63.25	0.02	21.8
			2	12.75	11.80	73.00	0.02	17.8	7.41	8.70	62.21	0.02	23.4
			3	13.49	12.76	67.79	0.02	18.0					
Kawasaki KH-500 3 cyl. 2-s	498	10.	1	20.00	26.55	56.25	0.01	14.6	Not run because violated manufacturer's break-in procedures				
			2	18.59	23.68	52.56	0.01	15.8					
Yamaha RD-400C 2 cyl. 2-s	398	8.5	1	12.25	10.29	62.08	0.02	20.1	"				
			2	12.16	10.53	62.45	0.02	20.0					
Kawasaki KE-175[a] 1 cyl. 2-s	174	5.1	1	7.56[a]	18.15[a]	34.77[a]	0.01[a]	27.1[a]	"				
			2	8.60	21.44	38.39	0.01	23.8					
			3	7.55	20.48	37.08	0.01	25.3					
Suzuki TS-100 1 cyl. 2-s	98	5.0	1	5.21	10.91	33.92	0.02	34.9	"				
			2	5.66	11.63	33.89	0.02	33.6					
Honda GL-1000 4 cyl. 4-s	999	14.	1	1.78	11.30	155.34	0.45	13.1	0.68	4.78	101.59	0.49	20.9
			2	2.07	10.69	143.37	0.41	14.1	0.63	4.53	99.04	0.49	21.5
			3	2.13	11.97	130.51	0.35	15.1					
Kawasaki KZ-900 4 cyl. 4-s	903	14.	1	2.64	33.80	87.03	0.15	15.9	0.85	23.67	69.58	0.25	21.3
			2	2.08	29.77	89.52	0.20	16.5	0.76	21.04	70.00	0.30	22.1
Honda CB-360T 2 cyl. 4-s	356	7.9	1	2.36	32.88	52.38	0.09	21.2					
			2	1.76	33.43	52.56	0.10	21.4	0.64	26.24	47.14	0.13	25.8
			3	1.96	31.31	53.19	0.11	21.8	0.56	20.27	48.15	0.20	28.5
Honda XL-125[b] 1 cyl. 4-s	124	5.0	1	0.74	13.19	37.68	0.12	38.9	0.31	12.40	31.99	0.10	44.4
			2	0.57	10.28	38.25	0.12	42.0	0.28	10.06	30.38	0.11	49.4
Suzuki RE-5 rotary	497	10.	1	7.27	30.59	152.09	0.17	10.6	2.95	10.33	122.97	0.28	15.7
			2	7.02	26.55	150.80	0.19	11.0	2.79	10.22	116.95	0.26	16.4
1978 standards				c	17.	—	—						
1980 standards				5.0	12.	—	—						
Statutory standards (LDV)				0.25	2.1	—	0.62[d]						

[a] first FTP mistakenly run on trace for Class I machines
[b] FET speeds all scaled down to 64 percent of normal
[c] see third column of table
[d] new statutory level, 0.25 g/km set as research objective

was performed at one shift increment lower than the upshift for each respective gear. This variation was used because it seemed unrepresentative of real operation to upshift and downshift at the same speeds. After consulting with the Project Officer, however, it was required that the EPA-recommended upshift and downshift points be observed during further test work.

C. Motorcycle Break-in

Break-in procedures were started following the completion of zero-kilometer testing. Each of the ten motorcycles required from 800 to 1600 km of moderate operation to fulfill the various break-in requirement. After completing the distance accumulation portion, all the motorcycles were serviced in accordance with their owner's manuals. This service generally included changing of engine and transmission oils, general lubrication and safety checks, and timing and valve clearance checks and/or adjustments. No carburetor mixture adjustments were made, although idle speed was adjusted if excessive. On 2-stroke machines, the oil injection settings were checked. The Kawasaki KH-500 had excessive exhaust smoke and very oily exhaust condensate at the pipe outlets, so the oil injection rate was leaned to the standard setting at the suggestion of the local dealer.

D. Baseline Emission Testing

Baseline emission testing was begun after thermocouples and CVS attachments were reinstalled on the test motorcycles. As with zero-kilometer testing, two FTPs and two FETs were scheduled for each motorcycle to establish baseline emissions. Table 15 summarizes the results obtained from these baseline tests. Standard motorcycle FTP traces were used in the driver's aid for Class II and Class III motorcycles, and the Class I motorcycle FTP trace was used for Class I motorcycles. Standard FETs (Highway Fuel Economy Tests) were used for all motorcycles during baseline determination. The Suzuki TS-100 (Class I) was limited to a top speed of 88 kph and could not therefore follow the FET cycle in its entirety.

A 250°C maximum head temperature limit was selected arbitrarily in order to prevent engine damage from overheating during testing. This temperature limit was not reached by any of the motorcycles during baseline runs. The general rule followed during both baseline, and later testing was to follow the FET trace whenever possible and to maintain the maximum permitted speed wherever the trace was above vehicle maximum speed or would have caused head temperature to exceed 250°C. Downshifting was performed at the corresponding upshift points, as specified in the Federal Register. Comparing baseline emissions with those obtained from zero-kilometer tests showed relatively small and mixed changes in emissions and fuel economy due to break-in operation.

E. Performance and Driveability Evaluations

Performance, usually thought of in terms of acceleration ability, was measured by the time required to accelerate from 0-100 kph (0-62 mph) on the dynamometer. This dynamometer acceleration procedure consisted of maintaining a relatively high "idle" rpm, then engaging the clutch smoothly so as not to cause wheelspin and rolling the throttle fully open (WOT). (Slippage between rear wheel and dynamometer roll was most likely to occur before inertia system

TABLE 15. SUMMARY OF BASELINE EMISSION TEST RESULTS

Motorcycle	Actual Displ., cm3	1978 HC Standard, g/km	Run	FTP Emissions, g/km				FTP Fuel km/l	FET Emissions, g/km				FET Fuel km/l	WOT Accel. 0-100 kph, seconds
				HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x		
Suzuki GT-750	738	14.	1	14.08	12.10	71.29	0.03	17.4	7.58	8.27	67.63	0.04	22.25	6.4
3 cyl. 2-s			2	14.16	12.04	73.45	0.03	17.1	8.55	9.58	66.37	0.03	21.46	
Kawasaki KH-500	498	10.	1	19.03	25.95	56.95	0.02	14.9	9.85	25.40	50.45	0.02	19.15	6.7
3 cyl. 2-s			2	19.49	26.54	54.83	0.02	14.9	10.96	27.29	49.86	0.02	18.26	
Yamaha RD-400C	398	8.5	1	10.21	12.64	59.29	0.02	21.1	4.95	12.15	54.83	0.03	25.99	7.6
2 cyl. 2-s			2	10.42	12.60	57.17	0.03	21.4	4.63	9.29	54.44	0.05	27.81	
Kawasaki KE-175	174	5.1	1	7.44	23.89	35.69	0.02	24.4	6.71	35.73	34.42	0.03	20.82	16.0
1 cyl. 2-s			2	7.51	24.42	36.31	0.02	24.0	6.25	33.75	32.50	0.03	22.10	
Suzuki TS-100	98	5.0	1	7.15	13.96	37.87	0.03	28.6	6.84	24.45	37.52	0.04	23.85	21.4[a]
1 cyl. 2-s			2	7.03	12.41	37.65	0.03	29.7	8.04	23.96	36.14	0.04	23.45	
Honda GL-1000	999	14.	1	2.73	12.20	118.45	0.39	16.1	0.64	4.06	87.92	0.55	24.17	5.6
4 cyl. 4-s			2	2.84	10.26	108.38	0.36	17.6	0.64	4.35	86.89	0.55	24.31	
Kawasaki KZ-900	903	14.	1	3.35	29.47	77.27	0.13	17.6	0.83	20.21	60.63	0.28	24.50	5.5
4 cyl. 4-s			2	3.20	27.10	69.02	0.16	19.4	0.84	20.03	56.35	0.25	25.73	
Honda CB-360T	356	7.9	1	2.34	29.75	45.58	0.09	23.7	0.73	22.54	43.86	0.17	28.54	9.0
2 cyl. 4-s			2	2.81	29.21	37.30	0.08	25.7	0.70	22.26	40.25	0.16	30.06	
Honda XL-125	124	5.0	1	0.71	10.60	37.03	0.13	42.2	0.44	8.58	48.13	0.96	36.96	32.2
1 cyl. 4-s			2	0.85	12.61	33.27	0.13	42.3	0.47	7.71	48.06	0.93	37.75	10.2[a]
Suzuki RE-5	497	10.	1	6.37	21.97	142.04	0.22	12.0	2.05	6.82	107.94	0.36	18.60	6.8
rotary			2	6.31	23.46	134.53	0.19	12.3	2.06	6.94	103.03	0.38	19.33	
1978 standards				b	17.	-----	----							
1980 standards				5.0	12.	-----	----							
Statutory standards (LDV)				0.25	2.1	-----	0.62							

[a] WOT acceleration time for 0-80 kph

[b] See third column of table

drive slippage due to the inertia system rotational speeds being reduced by two thirds of the design speed by use of the large single roll.) Upshifts, using the clutch, were performed at approximately 1000 rpm below "red line" rpm as indicated on the motorcycle's tachometer. Some tachometer readouts seemed sluggish as a result of internal damping, so shifting on these machines was performed on the basis of tachometer readout and driver judgment. The Suzuki TS-100 and the Honda XL-125 were not equipped with a tachometer, so upshifts were performed at speeds indicated as being within allowed maximums by their owner's manuals. These two Class I motorcycles could not reach 100 kph without possible engine damage, so times were taken for 0-80 kph (0-50 mph) accelerations. Results from baseline WOT accelerations are also presented in Table 15.

In addition to WOT acceleration performance, general performance (referred to as driveability) was also evaluated. A road evaluation procedure for motorcycles was adapted from a driveability rating method used with automobiles on a dynamometer.(5) This adapted motorcycle version is presented in Appendix B. Basically, the road evaluation procedure consisted of a cold phase and a hot phase. The cold phase (motorcycle soaked at 22.2°C) graded starting and (relatively) low speed operation; while the hot phase graded warm engine start-up and higher speed operation, including acceleration and deceleration characteristics. The rating system used for the various characteristics noted is presented in Table 16.

TABLE 16. DRIVEABILITY RATING SYSTEM FOR MOTORCYCLES

Function	Demerits			Weighting Factor
Starting				
Time		2/sec		1
Stall		6		3
Idle Quality	Good-1	Fair-2	Poor-3	1
Driving				
Stall		6		7

Function	Demerits by Severity			Weighting Factor
	Trace	Moderate	Heavy	
Driving				
Stumble	1	3	6	4
Hesitation	1	3	6	4
Backfire	1	2	3	4
Surge	1	2	3	2
Stretchiness	1	2	3	2
Vibration	1	2	3	1
Noise	1	2	3	2
Heat	2	3	4	3
Smoke/Odor	2	3	4	3

The purpose of these performance grades was not to compare different motorcycles, but rather to compare baseline performance to performance obtained with emission control hardware added. Results from two road evaluations on each motorcycle in stock configuration were graded using the demerit system shown above, and the results were then averaged for each motorcycle. This average became the individual motorcycle's base driveability number, by which later road evaluation grades were divided to yield a driveability ratio. The driveability ratios for all motorcycles in stock (baseline) configuration are thus 1.0. Ratios less than 1.0 showed performance improvement, while those greater than 1.0 showed performance degradation. Road evaluation data sheets are presented in Appendix B following the details of the evaluation process.

Two driveability ratios for each motorcycle are presented in Table 2 of the summary. The first is labeled "Driveability Ratio Including Stall" and the second is labeled "Driveability Ratio". Both ratios were derived from the same driveability evaluation, but the demerits attributed to the "stall" function are included in the first ratio but not in the second ratio. The reason for the differentiation was that the "stall" function commanded such a large portion of the demerits that it tended to mask effects of other functions to be evaluated.

V. EMISSION CONTROL SELECTION AND IMPLEMENTATION

This section first discusses briefly the emission control measures considered and finally selected, based on hardware availability and the usefulness of such measures in providing "proof of principle" within the scope of the program. A detailed discussion on implementation of selected control measures is given later in the section for each motorcycle, with emission results and photographic documentation presented as necessary.

A. Potential Control Measures and Selection

The viability of emission control measures depends on the availability of emission control hardware. Table 17 lists a number of the modifications or hardware systems which have the potential to reduce regulated pollutants from motorcycle engines. Not all of these modifications and systems were available, however, within the scope of this project.

TABLE 17. LIST OF ITEMS OR MODIFICATIONS FOR EMISSIONS REDUCTION

Carburetor (leaner)
Fuel injection, continuous
Fuel injection, timed high-pressure, with possible stratification of intake charge
Modified combustion chamber design
Improved F/A mixing via sonic carburetor or other design
Electronic Ignition
Oxidation catalysts (with supplemental air)
Air injection (continuous)
Exhaust throttling at idle (2-stroke)
Spark ignited intermittent exhaust afterburner (2-stroke)
Intermittent EGR (2-stroke)
Rich thermal reactor (with air)
Lean thermal reactor

Using the list in Table 17 as a guide, several manufacturers of engine-related products were contacted in order to acquire control items that could be adapted to the selected motorcycles. Although many manufacturers were helpful, most could not or did not manufacture adaptable hardware within the time frame of the project. Committments to supply items that could be used were received for monolith noble metal oxidation catalysts from Engelhard Industries, cloth mesh catalyst from Matsushita Electric Industrial, timed fuel injection system designed for 2-stroke snowmobile racing from Marvel-Schebler/Tillotson, and a capacitive-discharge ignition system designed for 2-stroke snowmobiles from Syncro. Preliminary arrangements were made, and some other items were located. Representatives of Suzuki were contacted concerning their previous efforts with 2-stroke exhaust afterburner system (EPIC system). Although no specific information was obtained, clearance to experiment with a similar system was obtained. Additional CDI systems were located. Air pumps and "pulsair" type reed valves for exhaust air injection were located and ordered.

Conferences were held with the Project Officer to decide on emission control approaches for the test motorcycles, based on responses to hardware inquiries and considerations of items or modifications which could be utilized effectively within the program. Results of the conferences are summarized in Table 18. It was agreed that stepwise modifications of each motorcycle would be the best approach, with documentation of each stage by FTP and FET testing. Steps preceded by a "+" sign in Table 18 were to be added to previous modifications, whereas those without this symbol were to be evaluated alone.

TABLE 18. EMISSION CONTROL MEASURES TO BE APPLIED TO TEST MOTORCYCLES

Motorcycle	First step	Second step	Third Step	Fourth step
Suzuki GT-750	CDI & minor[a] enleanment	+spark-ignited afterburner	+air injection	+catalyst
Kawasaki KH-500	catalyst & port liners	+minor[a] enleanment	+air injection	————
Yamaha RD-400C	thermal reactor & air injection	catalyst & air injection	————	————
Kawasaki KE-175	rotary valve modification	+minor[a] enleanment	+air injection & catalyst	(overscavenged gas capture)[d]
Suzuki TS-100	rotary valve modification	+minor[a] enleanment & CDI	+air injection & catalyst	————
Honda GL-1000	air injection	+catalyst	————	————
Kawasaki KZ-900	minor[a] enleanment & CDI	+air injection	+port liners	+ catalyst[c]
Honda CB-360T	major[a] enleanment & CDI	+air injection	+thermal reactor	+ catalyst[c]
Honda XL-125	air injection by pulsair	air injection by pump	+CDI and minor[a] enleanment	+ catalyst[c] less CDI
Suzuki RE-5	air addition[b]	+catalyst	————	————

[a] "minor" enleanment means adjustment, "major" enleanment means parts changes
[b] point of air addition to be determined
[c] step added later in the program, based on results obtained from previous control measures
[d] introductory experiment

Internal engine modifications such as changes to combustion chambers or valve overlap were not chosen due to their complexity and the proprietary knowledge required to make meaningful emission changes. Results of a brief investigation conducted into the effects of valve timing on hydrocarbon emissions from 4-stroke engines is given in Appendix C.

B. Implementation of Control Strategy

Following baseline testing which established the reference point for emissions, performance, and driveability, control techniques were applied according to the plan in Table 18. Control measures were applied to as many motorcycles as possible simultaneously in such a way that experiences from such applications could allow more efficient implementation of similar techniques on other motorcycles. Procedures evolved as problems with application of controls and detection of their activity were overcome. Progress on individual motorcycles will be covered individually, with some procedures explained in greater detail for one motorcycle than the others; because the procedures were developed first for one particular motorcycle and later adapted to the others with less difficulties. For example, procedures and analysis used to determine an optimum air injection rate to be used with catalysts were developed first for the Yamaha RD-400. This methodology is thus explained in detail for that motorcycle. Other motorcycles utilizing catalyst(s) and air were handled in essentially the same way. The following presentation begins with emission control adaptation to 4-stroke motorcycles and will conclude with 2-stroke machines. The order in which the motorcycle control information is presented is not necessarily the chronological order in which they were modified.

1. Honda CB-360

The application of several control measures began with work on the Honda CB-360. First experiments with this motorcycle were of an investigative nature, looking into the effective use of "pulsair" type air injection. This method makes use of one-way valves to admit extra air into the exhaust system when its pressure is below atmospheric, thereby making use of a pump unnecessary. The Honda CB-360 was used as a "pulse generator" for testing the three reed valves used in the program. The valve shown on the left in Figure 15 was designed for use as an induction system valve on a small Yamaha motorcycle. Both it and the valve (middle, Figure 15) were of conventional metal reed construction with overtravel stops. Both valve assemblies had two reed sections: the Yamaha, apparently for improved flow, and the Subaru, apparently to supply air to two separate exhaust streams. The Chevette valve (right, Figure 15) was a circular, flexible plastic type anchored at the center and designed to feed air to one exhaust stream (the entire stock assembly consisting of four reed valves fed four cylinders independently from a plenum attached to the air cleaner.

Initial efforts to quantify the air flow attainable with reed valves used a 1/4 NPT static tap on the exhaust pipe wall approximately 20 cm downstream of the exhaust port. A 6.4 mm sparger tube was later inserted extending just into the plane of the upstream end of the exhaust header. A "sparger tube" is an air injection probe with a closed end and holes drilled in its wall over a length of about 2.5 cm providing radial air discharge. This type of probe has been shown to provide better mixing and less exhaust gas cooling than open end air injection probes.(6) Figures 16 through 19 show some of the details discussed in relation to air injection.

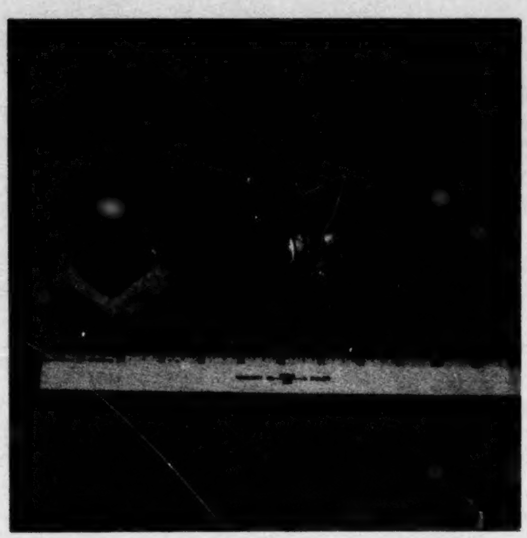


FIGURE 15. YAMAHA, SUBARU, AND CHEVETTE REED VALVES

FIGURE 16. HONDA CB-360 EXHAUST HEADER PIPE WITH SPARGER TUBE

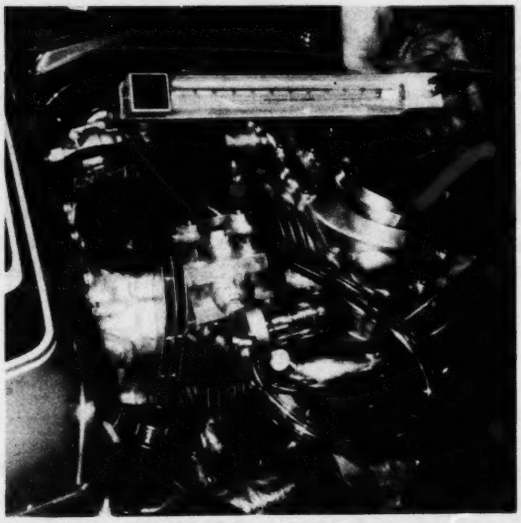


FIGURE 17. SUBARU REED VALVE FLOW RATE MEASUREMENT BY "ROTAMETER"

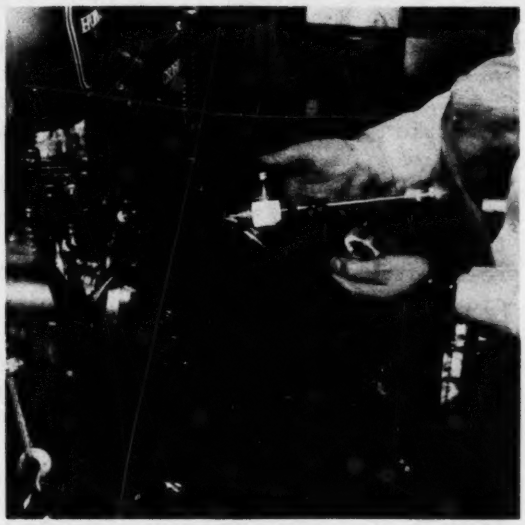


FIGURE 18. CHEVETTE REED VALVE FLOW RATE MEASUREMENT BY "BAG EVACUATION"

FIGURE 19. HONDA CB-360 WITH THERMAL REACTOR AND AIR INJECTION PROBES INSTALLED

Flowrates were determined initially using a rotameter on the inlet side of the reed valve (Figure 17). Concern over inlet restriction brought about by changes in flow as a result of the use of an inlet filter led to investigating the use of another method to measure the air flow into the system. A "bag evacuation" method was used, and it showed improved air flow characteristics for the systems in most cases (Figure 18). The "bag evacuation" method made use of a Tedlar bag filled with a known volume of air, and the time required to evacuate the air was measured yielding the flowrate. This method had the advantage of providing a pseudo "free air" intake atmosphere to the reed valve inlet and was considered more accurate than flowrates determined with the rotameter, because the measurement pressure drop was minimized. Repeatability of the bag evacuation time was generally good. Figures 20 and 21 show that reed valve air induction rates were improved by substituting a 9.5 mm (3/8 in.) thin wall sparger tube in place of the 6.4 mm sparger tube. The larger tube apparently conducted larger rarefaction and pressure waves to improve the acoustic response of the reed valves.

Steady-state emission concentrations were measured while air was being injected by the Subaru reed valve, using the stock pipe configuration (air into one pipe only). The results indicated that good oxidation was occurring at lower speeds, diminishing as speed increased. Noting that the air input from this reed valve also decreased with increased speed, 1.7 m^3/h (1 cfm) of air was injected by air pump during the 96.5 kph (60 mph) steady-state. In this check, no reaction occurred but rather dilution only. Reaction was distinguished from dilution by CO_2 increases or decreases, respectively, along with corresponding changes in other emissions.

The exhaust pipe system of the Honda CB-360 was modified in order to proceed with the application of thermal reactors and air injection (Figure 19). It was originally intended to test the usefulness of the experimental reactor design shown in Figure 22 and to decide if improvements or modification were needed to make it effective. This initial reactor design was intended for use on each of two exhaust pipes.(7) The core volume of each device was approximately 90 cm^3, and the total free volume was about 300 cm^3 plus the interior volume of the flange area. It was intended that if this device was successful, longer length versions might be applied to the Yamaha RD-400C (2-stroke).

The Yamaha induction reed valve, not received until after the exhaust modifications were performed, was subsequently tested with the thermal reactor canisters in the system. Results from air flow tests showed that this reed valve did not operate well in this configuration (Figure 23). The Chevette reed valve, which showed the best performance in previous tests, was re-installed on the modified pipe. A sharp decrease in performance of this reed valve was noted with and without the thermal reactor core in place.

The degradation noted in the performance of the Chevette reed valve may have been due to a change in the exhaust pipes' characteristic length, caused by the presence of the thermal reactor, which would change the response of the reed valve.(8) Although reed valves are a cost-effective means of injecting air into the exhaust when specifically designed for a particular system, care must be taken to maintain acoustic control so that the function of the reed valve is not changed. If air injection by reed valves is to be used, then the selection of a particular reed valve should be based on flow-rate data taken with the exhaust system in final test configuration. The original results with the Chevette reed valves could not be repeated with the modified exhaust pipe configuration. It appeared that air injection via this technique would not be applicable to the CB-360 due to the low injection rates obtained. The reed valves were tried on other motorcycles in an attempt to utilize pulse aspiration more effectively. No FTPs or FETs were run with these thermal reactors and air injection by reed valve, due to the small amounts of air delivered and the lack of positive results obtained in preliminary steady-state testing.

At the suggestion of the Project Officer, the Honda CB-360T was adapted with carburetors from a Honda 750K. The 750K carburetors utilize an accelerator pump circuit to maintain acceleration transient performance, while allowing enleanment to decrease the emission rates of CO and HC. The carburetors did present a problem in that adaptation hardware had to be made up in order to mount and operate the carburetors. The standard carburetors were 32 mm bore and were vacuum-actuated, whereas the replacements were 28 mm slide type. The difference in throat size was effectively cancelled by the manner of actuation, and the 28 mm units were therefore expected to be compatible with the engine configuration.(9)

Prior to installation of these replacement carburetors, a "baseline" steady-state sequence was performed. Sequence CBS-1 is presented in Appendix D along with other emission test results to be discussed. Steady-state sequence results are labeled with the respective motorcycle prefix followed by an S (numeral) to signify steady-state and run number. All steady-state data

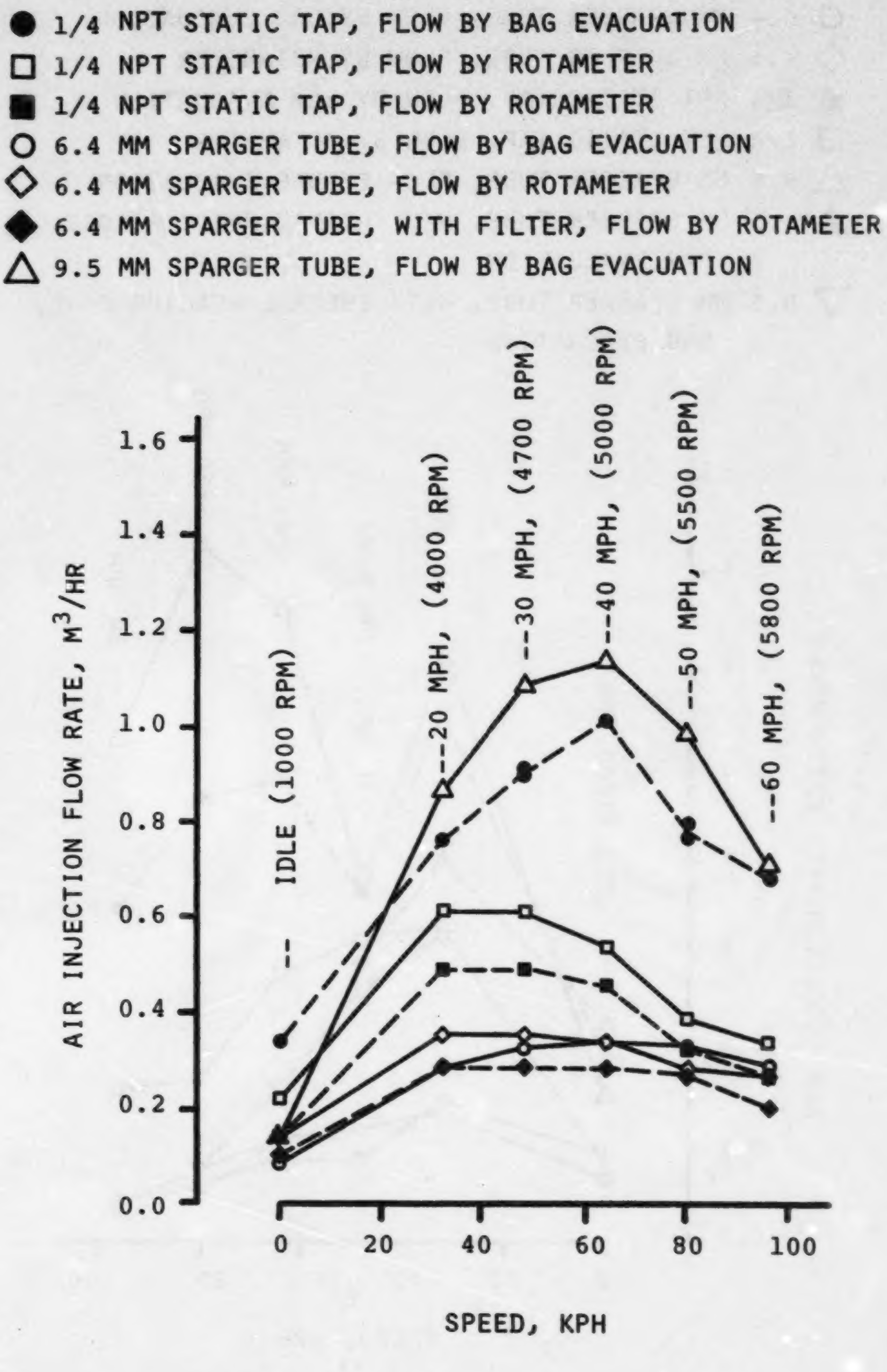


FIGURE 20. SUBARU REED VALVE FLOW INTO ONE EXHAUST PIPE OF HONDA CB-360

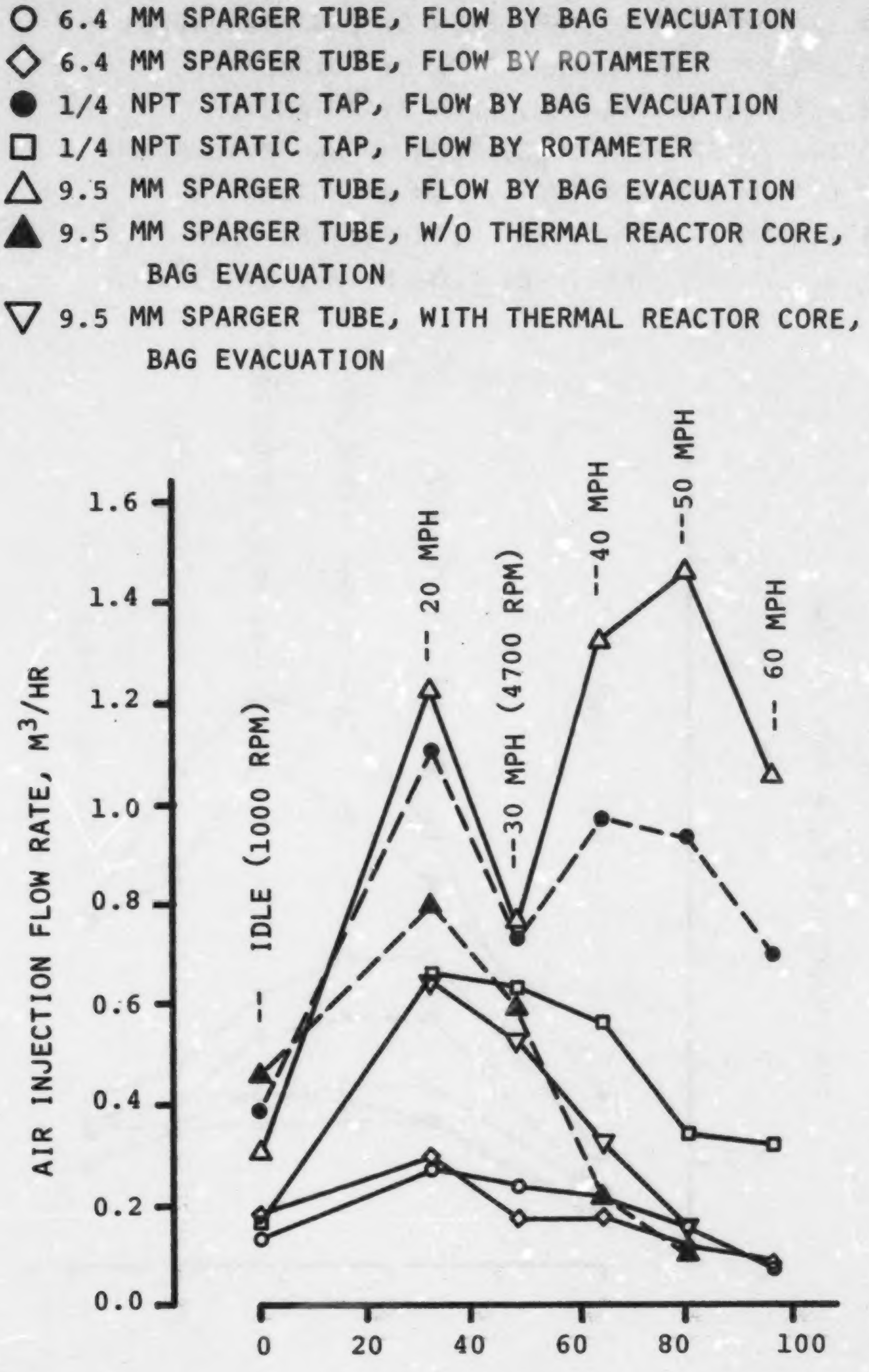


FIGURE 21. CHEVETTE REED VALVE FLOW INTO ONE EXHAUST PIPE OF HONDA CB-360

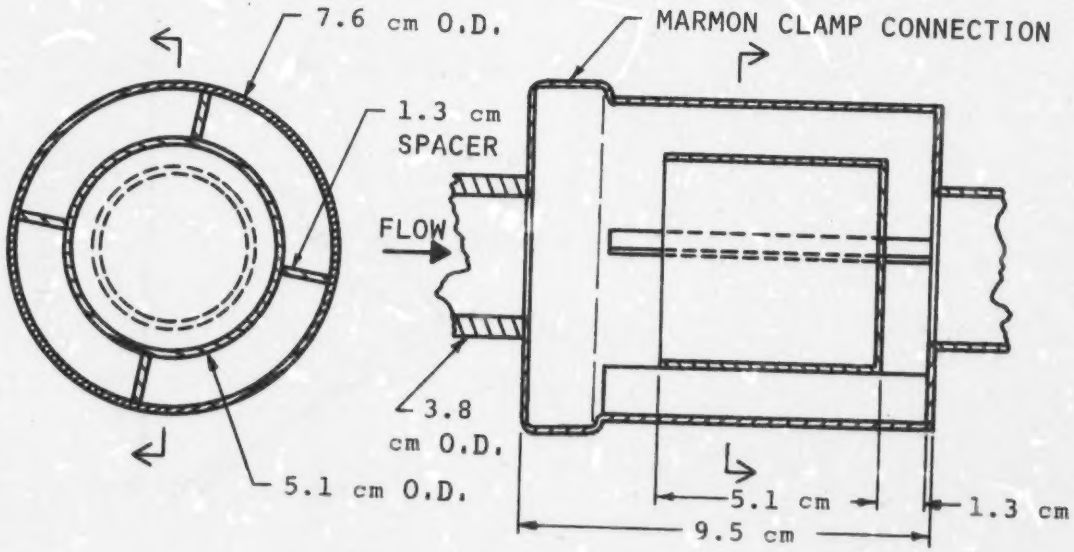

7.6 cm O.D.
MARMON CLAMP CONNECTION
1.3 cm SPACER
FLOW
3.8 cm O.D.
5.1 cm O.D.
5.1 cm
1.3 cm
9.5 cm

FIGURE 22. INITIAL THERMAL REACTOR DESIGN FOR HONDA CB-360 MOTORCYCLE

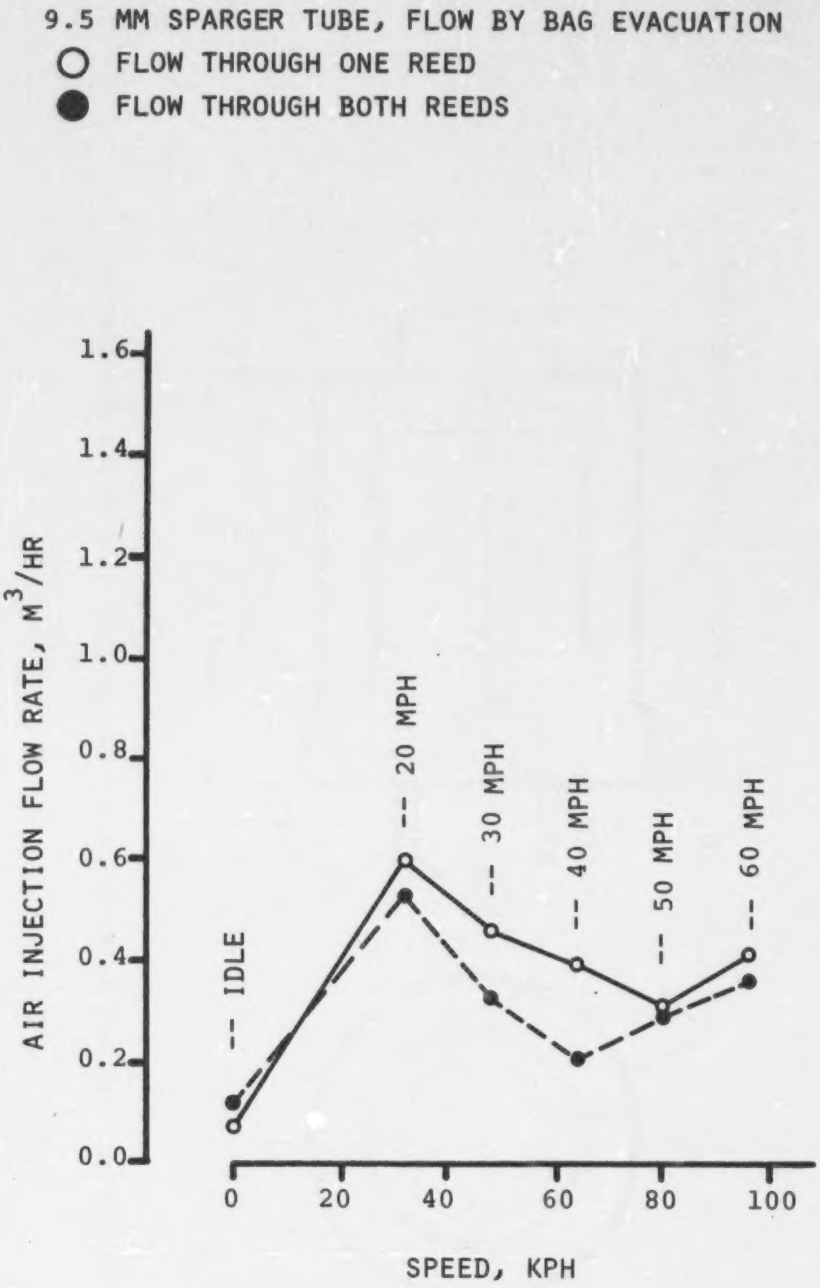


FIGURE 23. YAMAHA REED VALVE FLOW INTO ONE EXHAUST PIPE OF HONDA CB-360

will not be presented in this report because some of these tests were run to determine changes in emission trends due to adjustments, additions, or variation of parameters while studying the application of a control measure. Steady-state results that are reported or discussed as a "sequence" (labeled as above) were run to document emissions as a result of adjustments or step changes to control measures.

After installation of the two (inside cylinder) Kehin carburetors from a Honda 4-cylinder 750K, as shown in Figures 24 and 25, the engine started quite easily but would not run properly. Loose internal carburetor parts were found and secured. Road performance was "good", after carburetor adjustments were made.

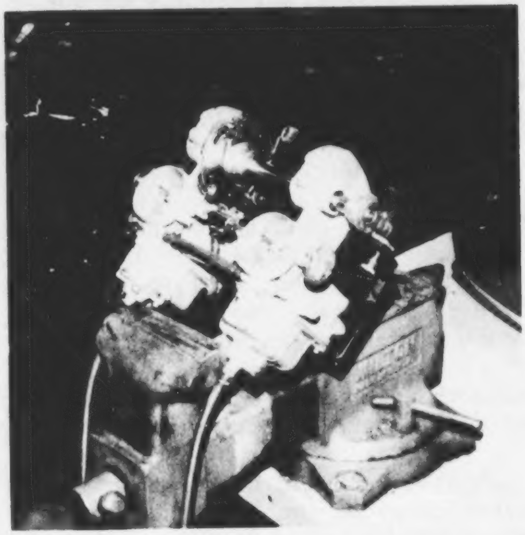


FIGURE 24. TWO INSIDE CYLINDER KEHIN CARBURETORS FROM HONDA 750K (NOTE ACCELERATOR PUMP ON BOTTOM OF LEFT BOWL AS VIEWED FROM AIR INTAKE SIDE)

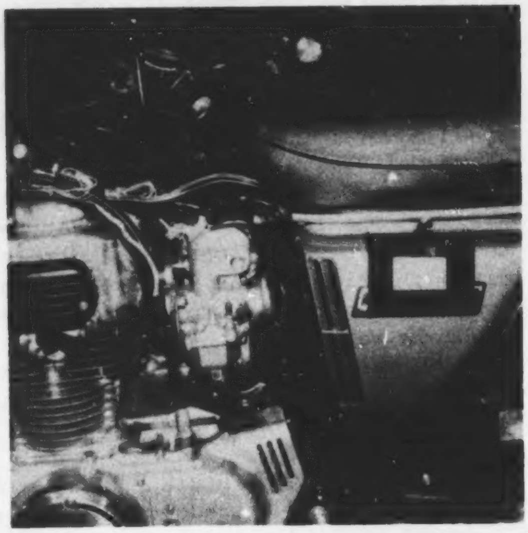


FIGURE 25. PARTIAL INSTALLATION OF TWO HONDA 750K CARBURETORS ON THE HONDA CB-360

Steady-state sequence CBS-2 showed good reductions in emissions of HC and CO as compared to the stock carburetors except at 96.5 kph. Replacement jets were ordered. FTP No. 1 and FET No. 1 were conducted with the 750K carburetors containing the supplied No. 115 main jet, and these results are given in Table 19. Good reductions in HC and CO were apparent for the FTP, but FET results reflected the presence of the rich main jet. Reduced copies of the computer printout from FTP and FET tests are given in Appendix D. WOT (0-100 km/hr acceleration) performance was 9.8 sec as compared to 9.0 sec average obtained during baseline.

TABLE 19. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE HONDA CB-360

Test		FTP Emission Rates, g/km				Fuel Econ.	FET Emission Rates, g/km				Fuel Econ.
Configuration	No.	HC	CO	CO_2	NO_x	km/ℓ	HC	CO	CO_2	NO_x	km/ℓ
Baseline Avg.		2.58	29.48	41.44	0.09	24.7	0.72	22.40	42.06	0.17	29.3
750K + #115 jets	1	0.73	5.80	70.55	0.36	28.7	0.40	6.30	62.32	0.72	31.7
750K + #105 jets + CDI	2	0.60	2.79	66.39	0.42	32.3	0.28	2.40	58.42	0.95	36.9
	3	0.68	2.50	67.43	0.42	31.9	0.26	1.28	58.45	1.07	38.0

The No. 115 main jets (1.15 mm inside diameter) were replaced with No. 95s (0.95 mm inside diameter), resulting in noticeable road performance degradation. Subsequently, No. 105 jets (1.05 mm inside diameter) were installed, which improved road performance again. In addition, an S. K. Systems Capacitive Discharge Ignition (CDI) for a 2-point set-up was installed; and the spark plugs were gapped to 1.0 mm (0.040 in.). Steady-state sequence CBS-3 was conducted, showing significant reduction in CO during the higher speed modes. FTP Nos. 2 and 3 with corresponding FETs followed these steady-states.

The lean jet replacement improved FTP and FET results, as shown by the dramatic reductions in both HC and CO as observed in Table 19. In addition, a significant increase in fuel economy was obtained. WOT (0-100 kph) acceleration time increased slightly from 9.8 to 10.0 sec. No driveability problems were encountered. Tests were conducted with air injection probes and thermal reactor canisters in place. It is assumed that these items had no part in the reduction of emissions because the probes were blocked, the reactor core was out, and no insulation was used on the exhaust pipes.

Head temperature and exhaust gas temperatures were higher than for baseline testing (as expected with lean operation), but the 250°C head temperature "limit" was not reached at any time during testing in this configuration. The head temperature "limit" of 250°C was chosen after conversations with local dealer personnel of the various manufacturers. None of the dealers had positive information as to an exact head temperature limit, but there was general consensus that 250°C (482°F) was probably a reasonable limit considering the location of measurement (between spark plug and head seat) and the type of testing to be conducted.

Following the successful adaptation of the two Honda 750K carburetors to the CB-360, steady-states were conducted while compressed air was injected into the exhaust system. Although the thermal reactor cores were not in place, the exhaust pipes were heavily insulated for the first 38 cm (15 in.) downstream of the exhaust port. No reactions were noted by either temperature or raw emission data. Such findings were anticipated, due to the relatively low concentrations of HC and CO present. As a result, no further efforts were made to reduce emissions via air injection alone.

The next scheduled control measure was to incorporate thermal reactors into the system. As mentioned previously, the thermal reactor canisters were already in position but no cores had been used. The cores were installed in the canisters located approximately 25 cm (10 in.) downstream of the exhaust port (refer to Figures 19 and 22). Steady-state testing with varying amounts of air injection showed insignificant effects on emissions at air flow rates between 2.4 and 4.1 m^3/h (1.4 and 2.4 cfm), although some reaction did occur during some conditions. Results with air addition were recorded on strip charts. Reaction or nonreaction with air addition were determined by changes in emission concentrations and increases in exhaust temperature from values obtained without air injection. Subsequent inspection of the original cores indicated that most of the exhaust flow appeared to by-pass the cores due to their small diameter and the cores' position in relation to the curvature in the exhaust system. Larger cores, 6.4 cm (2-1/2 in.) in diameter, were fabricated and installed into the heavily insulated canisters and header pipe system as shown in Figure 26.

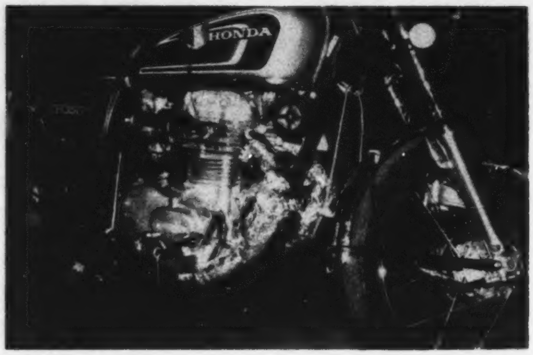


FIGURE 26. HONDA CB-360 WITH INSULATED HEADER PIPES AND THERMAL REACTORS

Once again, steady-states were conducted with variable air injection. The only reactions were of even smaller magnitude than those noted with the original cores. No significant degradation of performance due to increased backpressure was noted. WOT (0-100 kph) acceleration time increased slightly from 10.0 to 10.3 sec compared to the most recent tests. Steady-state sequence CBS-4 (with large cores and insulation) was recorded without the addition of air so that emissions obtained from sequence CBS-3 (without thermal reactor cores and insulation) could be compared. Due to the minor effectiveness shown by the various steady-state testing, including CBS-4, no further testing of this first thermal reactor design was conducted.

A new design shown in Figure 27 was adapted from automotive applications.(10,11,12) Two reactors of this design were welded into the exhaust system as shown in Figure 28. After several layers of asbestos insulation were added, as shown in Figure 29, steady-states were conducted with compressed

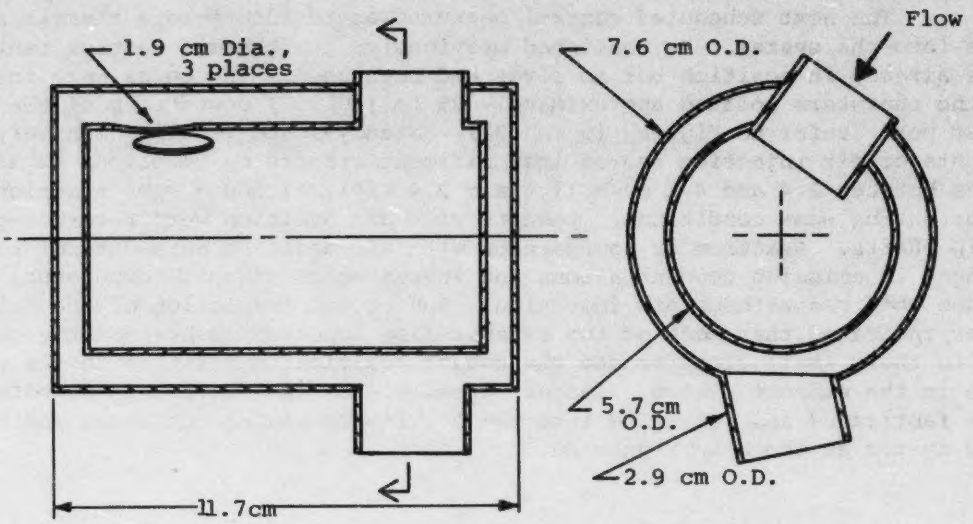

1.9 cm Dia.,
3 places
7.6 cm O.D.
Flow
5.7 cm
O.D.
2.9 cm O.D.
11.7cm

FIGURE 27. SMALL THERMAL REACTOR WITH GAS FLOW PATH SIMILAR TO AUTOMOTIVE CONCEPTS (SECOND DESIGN)

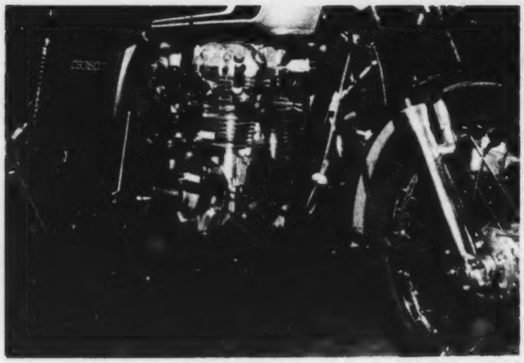


FIGURE 28. THERMAL REACTORS OF SECCOND DESIGN INSTALLED ON HONDA CB-360

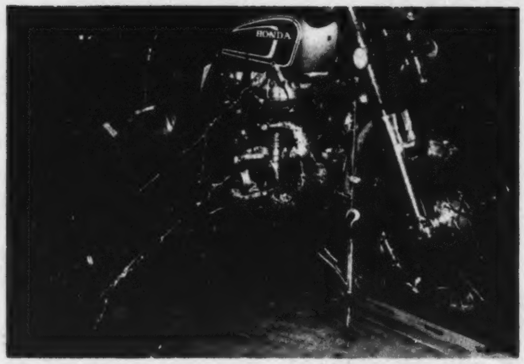


FIGURE 29. THERMAL REACTORS WITH INSULATION APPLIED ON HONDA CB-360

air injection varied from 0 to 4.3 m^3/h (2.5 cfm). Minor reactions at lower speeds were indicated by temperature increases within the exhaust header leading to the thermal reactors. No reactions were noted at 64, 80, or 97 kph (40, 50, or 60 mph). Steady-state sequence CBS-5 was recorded without air addition and showed relatively scattered emission results. This scattering was assumed to be the result of backpressure effects.

Because previous emission results showed relatively low CO concentrations, basic timing was retarded 10° from standard basic timing in order to improve the chances for exhaust reaction to occur in the thermal reactors. Steady-state sequence CBS-6 was conducted, indicating that substantial emission reductions occurred. Exhaust temperature data indicated that the reactions were not occurring in the thermal reactors, but rather in the insulated header pipes leading into the reactors. The only core reactions occurred during hot idle following 97 kph operation. This result was probably due to residual heat release, a function of the reactor's thermal inertia. No FTPs or FETs were run in this configuration, although retarding the timing and adding air did lower emissions of HC and CO. Retarded timing had not been called for as a control measure; therefore, attempts were extended to cause thermal reactions without the use of retarded timing.

Efforts to richen the combustion mixture in order to obtain oxidation in the thermal reactors with standard timing were made. The adapted 750K carburetors' jet needle clip positions were changed from the top to the third position. The idle mixture screw was left at two turns out from bottom. Steady-states were conducted with air injection rates varied from 0 to 4.9 m^3/h. Reactions were observed by both emission changes and temperature data at speeds of 32, 48, and 64 kph at air injection rates of 1.2 to 4.9 m^3/h. These reactions were noted first in the left exhaust at an average air injection rate of 1.7 m^3/h (1.0 cfm), with reactions noted in the right exhaust with about 50 percent higher injection rates. This imbalance was attributed to carburetion differences between cylinders. A Gast air pump No. 1533 driven at 1:1 (pump:crankshaft) drive ratio was installed. The results of two FTPs and FETs conducted in this configuration are given in Table 20. Comparing these results to those listed in Table 19 show further reduction of HC for both FTP and FET operation. Emission of CO increased slightly from previous FTP results, although FETs showed decreased CO emission.

TABLE 20. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE HONDA CB-360

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.	2.58	29.48	41.44	0.09	24.7	0.72	22.40	42.06	0.17	29.3
Rich 750k Carb.s + Thermal Reactor + Air	0.37	3.73	68.74	0.29	31.0	0.19	1.27	61.78	0.76	36.2
	0.38	3.76	78.23	0.32	27.5	0.17	1.53	59.78	0.85	37.1

No acute driveability problems were encountered during FTP and FET and steady-state sequence (CBS-7) operation; however, WOT acceleration (0-100 kph) increased drastically to 23 sec. The acceleration test was the last test run in this configuration. The engine would start the acceleration quite normally in the lower gears, but the rate diminished abnormally as the speed increased. An increase in backpressure caused by the thermal reactors was the suspected cause of the problem, but the poor performance was duplicated with stock header pipes. Carburetion inspection revealed that one cylinder was inactive intermittently as a result of poor vacuum alignment. Efforts to align the carburetors revealed an air intake leak between the carburetor and the engine which caused overenleanment of the right cylinder. With the air leak repaired and the carburetors reinstalled, the WOT acceleration time was approximately 17 sec. It was assumed that this acceleration time was representative of the engine configuration during the emission test phase.

Continuing with the planned control measures to reduce emissions from the Honda CB-360, two PTX-313 catalysts (supplied by Engelhard) were installed about 25 cm (10 in.) downstream of the exhaust port (as shown in Figure 30). These catalysts were made of Corning substrate of 46.5 square cells/cm^2 (300 square cells/$in.^2$) with 1.77 kg/m^3 (50 g/ft^3) platinum-palladium loading (ratio unknown). Steady-states with variation of air injection rates were run in order to optimize the air pump size, using the procedure as described later with the discussion of the Yamaha RD-400. Air pump No. 0533 driven at 1:1 ratio was selected for use with catalysts. Engine performance began to degrade such that FTP and FET test cycles could not be run properly. Inspection of the carburetor setup revealed no problems with intake air leaks or vacuum alignment. One catalyst was removed from the system and inspected for plugging or burnout as a result of misfiring. No damage to the catalyst was observed. The engine performed as though it was overly lean, and temperature data showed that cylinder operation was unbalanced. The carburetors were inspected and cleaned. As before, driveability was restored; but the problem reappeared after a short time. More carburetor maintenance and rich adjustments were performed, but the results were negative. It was decided to discontinue running with the 750K carburetors because of the intermittent problems encountered.

In order to continue the demonstration of catalyst effectiveness, the original Honda CB-360 carburetors were reinstalled on the motorcycle. These carburetors were set very rich as indicated by the baseline emissions. No adjustments were made to the carburetors other than idle speed. Steady-states with variation of air injection rates indicated that a relatively large quantity of air was necessary in conjunction with the catalyst to oxidize the HC and CO concentrations resulting from use of the stock carburetors. Another factor used to select the air injection pump was the catalyst exit temperature limitation of 950°C. Gas air pump No. 0440 driven at 0.5:1 ratio (pump:crankshaft) was chosen. Figure 31 illustrates the relatively large air pump used to supply exhaust air addition.

Steady-state sequence CBS-8 was conducted and showed major reductions in HC and CO when compared to any of the previous sequences, especially sequence CBS-1. Catalyst entrance and exit temperatures along with the corresponding air injection rate for each steady-state speed tested are also presented with CBS-8. WOT (0-100 kph) acceleration time was 14.6 sec. The results are given in Table 21.

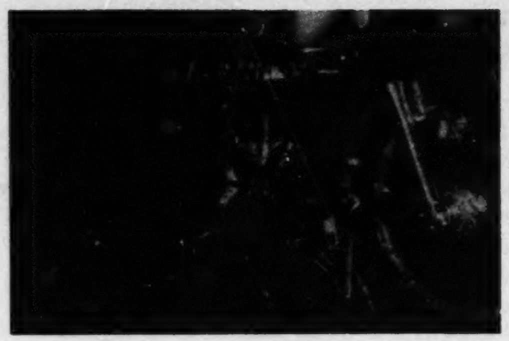


FIGURE 30. CATALYSTS APPLIED TO HONDA CB-360

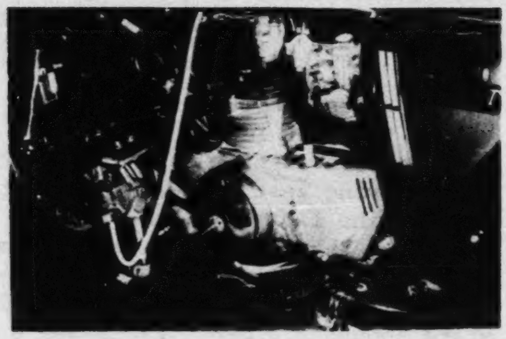


FIGURE 31. PUMP NO. 0440 USED WITH CATALYST ON HONDA CB-360

TABLE 21. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE HONDA CB-360

Test Configuration	FTP Emission Rates, g/km				Fuel Econ.	FET Emission Rates, g/km				Fuel Econ.
	HC	CO	CO_2	NO_x	km/ℓ	HC	CO	CO_2	NO_x	km/ℓ
Baseline Avg.	2.58	29.48	41.44	0.09	24.7	0.72	22.40	42.06	0.17	29.3
Orig. Carb.s + Cat.	0.35	5.04	103.65	0.10	20.8	0.09	4.14	80.45	0.19	26.7
+ Air + CDI	0.32	5.56	108.21	0.12	19.9	0.10	4.69	79.46	0.18	26.7

As with steady-state results, the transient test results indicated major reductions of HC and CO emission when compared to baseline tests. The apparent decrease in fuel economy from baseline results was attributed to the relatively large air injection requirement, hence power requirement, and partially to the increase in backpressure caused by the high temperature operation of the catalyst.

2. Kawasaki KZ-900

Prior to starting modifications, a few steady-state runs were made to verify the "baseline" results obtained before the maladjustment program. These and other emission test data are presented in Appendix D. Run KZS-2 essentially repeated data taken from the maladjustment phase presented in Appendix E and discussed in Section VI. The first steps toward emission control for the KZ-900 were minor enleanment of the carburetors and the addition of a capacitive discharge ignition system. Several steady-state emission sequences were conducted in order to document the effects of these measures. Run KZS-3 showed that the CDI system (2-point type from SK Systems) could contribute to a moderate fuel economy improvement; because CO, CO_2, and HC emissions were slightly lower for the steady-states when the CDI system was used. As indicated from the results of run KZS-4, CO and HC were further reduced by moving the jet needle clip up two notches (from the stock position to the top notch) and by turning the pilot air screws out one and a half turns from the as-received positions. Although very low emission rates of CO were obtained, the "overenleanment" of the pilot air system caused such a degradation of transient performance that the driver could not follow the FTP cold start driving cycle without excessive use of the choke.

Results from steady-state sequence KZS-6 showed lower CO and HC values than the KZS-4, as a result of a slightly richer pilot air system and the effects of carburetor vacuum alignment. After a forced-cool start LA-4 driving test, it was thought that the "borderline limit" had been reached. "Borderline limit" will be used to describe the leanest adjustment which will (1) allow the motorcycle to perform a cold start FTP without excessive use of the choke, (2) not cause the head temperature to exceed the 250°C limit, and (3) retain acceptable road performance. FTP No. 1 was run after steady-state sequence KZS-6. Excessive use of the choke system was necessary to operate the motorcycle through the cold start portion of the FTP (first 505 seconds), causing an extreme difference in emission concentrations between the first and third sets of bags. The pilot air system was enriched again, and steady-state sequence KZS-7 results showed that the emission of CO was increased at the lower speeds. The cold start performance was improved.

FTP No. 2 was conducted with these "borderline" adjustments and the choke fully on for the first 60 seconds. FTP No. 3 was conducted with the same adjustments as the previous test, but the choke was nursed through the cold start phase and was completely off after 50 seconds. This operating change cut the first bag HC concentrations in half. An FET was conducted after each FTP. Results from FET No. 1 and No. 2 are within test variability of each other, even though there were adjustments made to the pilot air system. The pilot air system's primary effects are on transition response and lower speed operation, so no significant change in emissions was expected for the highway cycle due to its higher average speed. The variation in results obtained from FET No. 2 and No. 3 may have resulted from variation in throttle response. After these tests, road performance evaluation showed that the borderline limit was exceeded because road performance had degraded. Acute hesitation was evident.

Carburetor adjustments to improve road performance of the KZ-900 to the "borderline limit" were undertaken. Several increments of adjustment followed by road trials were used to determine the lean borderline limit, for which road performance was acceptable within a reasonable ambient temperature range. FTP No. 4, FTP No. 5, FET No. 4, FET No. 5, and steady-states KZS-8 were conducted with the pilot air system adjusted to one and three fourths turns out from bottom and after carburetor alignment had been made. The transient emission test results are presented in Table 22, including baseline results for reference.

FTP No. 4 and No. 5 showed significant reductions in the emission rate of HC and CO when compared to the baseline emission test results. These same changes were also shown in corresponding FET results. Emission rates of CO were higher than for previous borderline tests (Nos. 1, 2, and 3), but the emissions of HC were lower. This finding implies that the previous settings were too lean (even though no misfire was apparent) and required additional throttle opening to negotiate the test cycle. Steady-state sequence No. KZS-8 showed minor reductions in HC emission rate, while the idle and lower speed operation showed increases in CO. These final lean carburetor settings did not affect the WOT acceleration time of 5.5 seconds.

TABLE 22. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE KAWASAKI KZ-900

Test		FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
Configuration	No.	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.		3.28	28.29	73.15	0.15	18.5	0.84	20.12	58.49	0.27	25.1
Return Base		2.70	29.64	78.05	0.19	17.7	0.90	20.25	65.67	0.32	23.2
2nd Lean Adjust. + CDI	1	3.85	5.17	103.85	0.37	18.9	0.42	1.09	89.88	0.68	25.1
3rd Lean Adjust. + CDI	2	3.31	11.27	98.04	0.36	18.6	0.43	1.91	85.75	0.78	25.8
	3	2.21	9.98	97.92	0.38	19.5	0.39	1.47	80.55	0.68	27.7
Final Lean Adjust. + CDI	4	1.68	18.15	88.75	0.34	19.2	0.46	4.82	80.87	0.73	25.9
	5	1.77	17.48	84.55	0.33	20.0	0.45	3.79	83.67	0.73	25.8

Sparger tubes of 7.8 mm (5/16 in.) diameter were installed in order to proceed with air injection, the second step control measure. Compressed shop air was regulated into the probes through a common tube manifold which fed all four sparger tubes (located in the exhaust pipes with their ends approximately 2.5 cm from the exhaust valve opening). Both dilute emissions and exhaust gas temperatures were monitored in an effort to observe reactions. Dilute emissions were subsequently found to be not sensitive enough to indicate reactions, so temperature traces were used as the primary indicator. Increasing temperature in the exhaust gases indicated reaction occurring. Some exhaust gas reaction was noted about 10 cm downstream from the exhaust port at idle, diminishing as engine speed increased. No reaction at all was observed at 80 or 97 kph (50 to 60 mph). A maximum temperature change of 50°C occurred at idle with 1.36 m^3/h (0.8 cfm) air added to each of the four exhaust pipes. A 30°C change was noted at 48 kph (30 mph). Changes above 64 kph were difficult to distinguish because slight throttle motion could effectively mask minor reactions.

Stronger reaction was noted with higher air flow injection rates, so the available air was injected into only the two right side pipes (which contain thermocouples). Also, these two pipes were insulated for about the first 64 cm (25 in.) in order to retain heat and promote further reaction. Greater temperature rises were noted with the increased air supply. These changes were 60°C at idle, increasing to 125°C at 32 kph and up to 180°C at 48 kph. Minor reaction was noted at 64 kph, with even less at 80 kph; and no reaction was noted at 97 kph. Reactions at 64 and 80 kph were observed about 30 cm down the exhaust pipe. Air injection by compressed air was continued in order to accurately size pump requirements for optimum exhaust oxidation. Based on raw emission and temperature data obtained with up to 22 m^3/h (13 cfm) air injection, a Gast air pump No. 0440 was selected to provide approximately 8.5 m^3/h (5.0 cfm) at 48 kph.

Before a pump was actually mounted on this machine, the Chevette reed valves were tried in an attempt to get some reaction during FTP and FET operation. These reed valves were fitted to each cylinder's injection probe as shown in Figure 32. Steady-state sequence KZS-9 was conducted in this configuration. Although no well-defined reactions were noted, an FTP and an FET were run. Insignificant variations in the emissions of HC and CO were observed, verifying earlier results indicating that reed valve air induction alone provided insufficient quantities of air to promote reaction.

Figure 33 shows Gast pump No. 0440 mounted and driven by an extension of the crankshaft with a drive ratio of 1.07:1 (pump to crankshaft). Figure 34 shows the air injection flowrates obtained with this drive system. After results from steady-state sequence No. KZS-10 verified that exhaust reactions were taking place, two FTPs and two FETs were conducted. The results from these and some previous tests are presented in Table 23.

The FTP results show a decrease in the emission rate of CO, but this reduction is accompanied by an increase in the emission of HC and a decrease in fuel economy when compared to results obtained with leaned carburetors and CDI only. Minor reduction in CO and a decrease in fuel economy are noted for FET results, although emission of HC remained the same as the most recent tests. It should be noted that the air pump required was large enough to make its power requirement significant in relation to its effect on the emission results.

FIGURE 32. AIR INJECTION USING CHEVETTE REED VALVES

FIGURE 33. AIR INJECTION USING PUMP

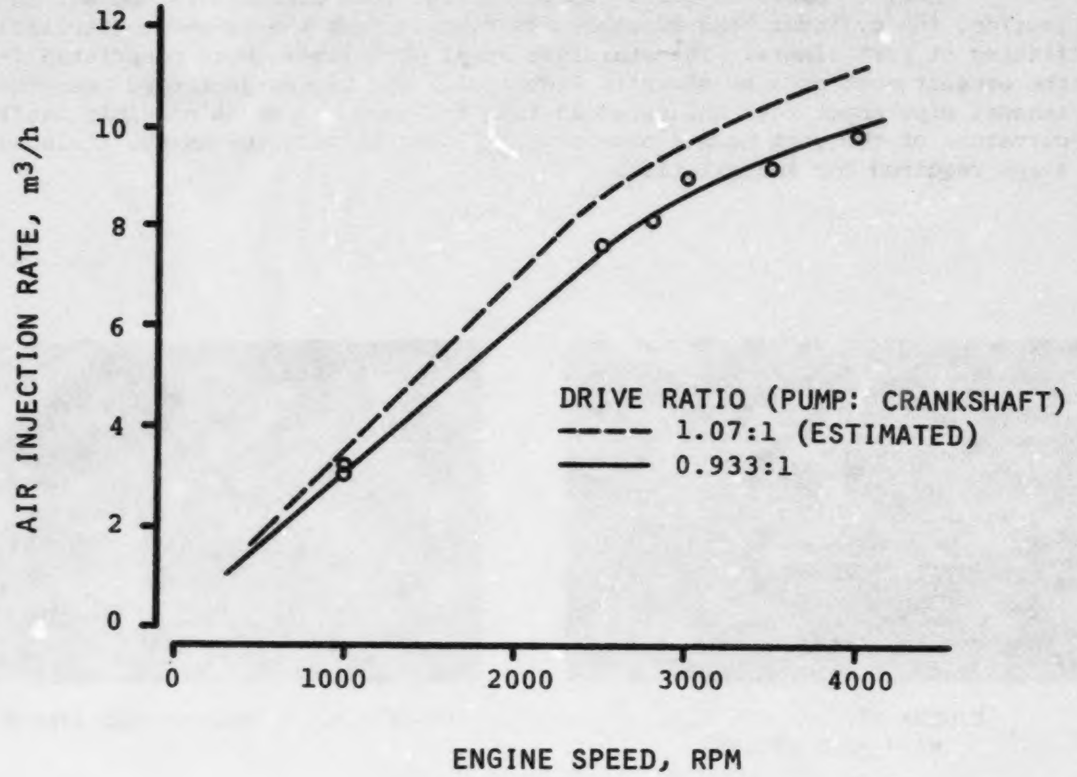


FIGURE 34. AIR INJECTION INTO KZ-900 VIA GAST PUMP NO. 0440

TABLE 23. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE KAWASAKI KZ-900

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.	3.28	28.29	73.15	0.15	18.5	0.84	20.12	58.49	0.27	25.1
Final Lean Adjust. + CDI	1.68	18.15	88.75	0.34	19.2	0.46	4.82	80.87	0.73	25.9
	1.77	17.48	84.55	0.33	20.0	0.45	3.79	82.67	0.73	25.9
Lean + CDI + Air (Pump)	2.12	10.28	114.40	0.33	17.1	8.46	2.07	96.11	0.66	23.1
	2.29	9.83	117.27	0.35	16.8	0.40	1.75	98.67	0.68	22.7

Having completed tests conducted with lean carburetors and air injection, the cylinder head assembly was removed from the KZ-900 to facilitate fitting of port liners. The stainless steel port liners were handfitted into the exhaust port area as shown in Figure 35. The liners protruded into the exhaust pipe about 6 mm and extended into the head as far as possible until curvature of the port became excessive. Figure 36 illustrates the finished shape required for installation.

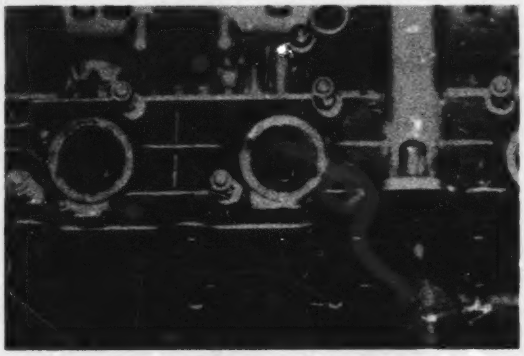


FIGURE 35. KZ-900 HEAD WITH PORT LINERS

FIGURE 36. FINISHED PORT LINERS

No major increase in exhaust temperatures were noted due to port liners, although an increase of 50°C was noted during idle at the first thermocouple station. Steady-state sequence KZS-11 indicated some changes in emissions at various speeds, but these changes are attributed to dilution. A significant reduction in HC was noted during idle, but an increase in HC appeared at 80 kph. Emission of CO remained about the same as previous steady-state data. The results of two FTPs and two FETs conducted with lean carburetors, CDI, air injection and port liners appear in Table 24. Good reduction of HC was observed for FTP results compared to the results shown in Table 23, whereas very little change was noted in FET results. WOT acceleration time increased slightly from an average of 5.5 to 5.9 seconds.

TABLE 24. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE KAWASAKI KZ-900

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Lean + CDI + Air + Port Liners	1.54	8.52	111.52	0.34	18.1	0.32	1.87	94.27	0.75	23.7
	1.38	7.91	109.38	0.32	18.6	0.31	1.92	93.31	0.72	23.9
All the above + VAC Realigned	1.59	9.15	115.42	0.33	17.4	0.30	2.30	88.83	0.74	24.9
	1.58	8.38	108.45	0.32	18.6	0.31	1.96	84.50	0.69	26.3

Due to concern that the carburetor alignment may have been in error, the vacuum was checked for all four carburetors at idle. It was discovered that the vacuum on one of the four carburetors was approximately 6 cm Hg lower than the other three, so realignment was made and two more FTPs and FETs were run. The results of these tests are given in Table 24. In addition, results from sequence KZS-12 (with vacuum alignment) are given in Appendix D.

Following these tests with the addition of port liners, two Engelhard PTX 413 catalysts were added to the exhaust system. These monolith catalysts had an active volume of 440 cm^3 (26.8 $in.^3$) each and utilized a Corning substrate of 45.8 quare cells/cm^2 (300 square cells/$in.^2$) with a loading of 1.77 kg/m^3 (50 g/ft^3) of a platinum and palladium mixture (ratio unknown). The catalyst cores were located approximately 60 cm (24 in.) downstream of the exhaust ports. At this location, exhaust gases from two adjacent pipes were combined at the entry to each catalyst assembly. As the gases left the catalysts, they were redistributed into the four tailpipe mufflers. Due to the large diameter of the catalyst assembly, backpressure effects were considered negligible. Steady-state tests with variation of air injection rate were performed before selecting pump No. 0440 with a drive ratio of 0.6:1 (pump:crankshaft). Figure 37 shows the KZ-900 in the final test configuration. Results from steady-state sequence KZS-13, run in this configuration, show significant reductions of both HC and CO. Air injection rates and catalyst entrance and exit temperatures corresponding to steady-state speeds are also given. Two FTPs and two FETs were run, and their results are given below in Table 25. Significant reduction in HC and CO were also noted for these transient tests. Acceleration performance (0-100 kph) was the same as baseline (5.5 sec), and no major complaints were noted during road driveability evaluations.

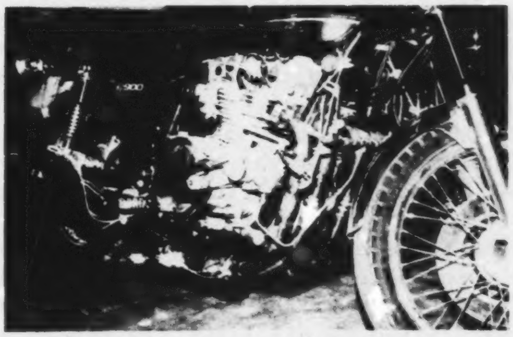


FIGURE 37. KZ-900 WITH CATALYSTS
AND AIR INJECTION

TABLE 25. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE KAWASAKI KZ-900

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.	3.28	28.29	73.15	0.15	18.5	0.84	20.12	58.49	0.27	25.1
Lean + CDI + Air + Pt. Lin. + Catalysts	0.39	1.75	120.68	0.21	18.8	0.04	0.14	88.53	0.43	26.2
	0.40	1.94	123.65	0.23	18.3	0.08	0.57	89.29	0.41	25.7

3. Honda XL-125

Following baseline emission testing, the Honda XL-125 was involved in a maladjustment testing phase (to be discussed in Section VI). Carburetor adjustments and timing were then returned to the stock settings used to conduct zero-kilometer and baseline testing. With these adjustments, the motorcycle stalled repeatedly during idle modes of the FTP conducted to determine if the engine had been returned to "baseline" conditions. From steady-states run subsequently, it was determined that the idle circuit of the carburetor was the cause of the poor operation. After the carburetor was cleaned and reassembled, the problem still prevailed. The engine stalled frequently after a normal deceleration and as the throttle was cracked open for the start of a normal acceleration. Timing and mechanical advance parts were checked. Once again, the carburetor was dismantled and thoroughly checked and cleaned. After reassembly, the engine was started and an improvement in idle quality was noted. Subsequent FTP and FET emission test results approached the baseline values within the expectations of the program, considering that a significant distance had been accumulated by testing since the baseline study. Although the specific problem in the XL-125's carburetor was not detected, it did appear to be "cured" following the last teardown and cleaning.

With the XL-125 back to "stock" configuration, mounting of a Gast oiless rotary vane air pump (No. 0533) was begun. This air injection pump was selected on the basis of continuous diluted emission traces obtained during baseline FTPs. Emission rates at operating conditions under which air injection would be applicable were taken, and the amounts of air needed to oxidize these emissions were calculated. The pump was first modified with the intent of mounting it directly to the crankshaft or the camshaft, placement of which would be determined by air flowrates needed and the degree of obstruction to the rider. After solving some minor problems in shimming and aligning the modified pump, installation proceeded. As the installation progressed, it was decided to use the pump in its stock configuration and drive it by use of a small "gearbelt" drive. This drive method (as shown in Figure 38) allowed more flexibility in positioning, cooling, speed selection, and vibration control of the pump.

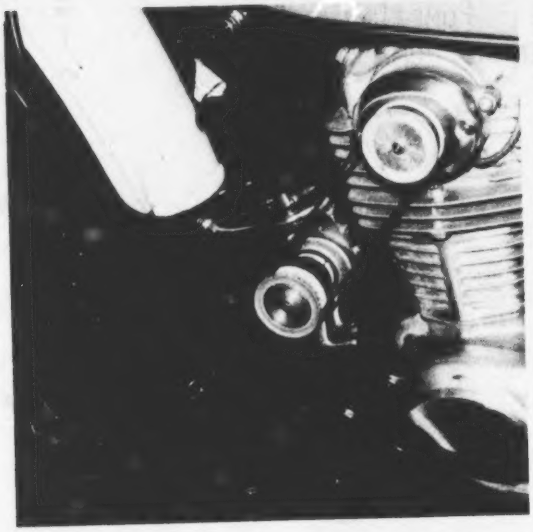


FIGURE 38. XL-125 WITH AIR INJECTION
PUMP NO. 0533 DRIVEN AT
1:2 RATIO (PUMP:CRANKSHAFT)

Air was injected by this pump through a 7.8 mm (5/16 in.) diameter sparger tube during steady-state sequence XLS-2, yielding little (if any) reaction. The 64 kph (40 mph) steady-state data indicated that some minor reaction occurred, but the differences noted may have been more the result of dilution and test-to-test variability rather than any significant reaction. Overall, it appeared that pump No. 0533 did not supply enough additional air to start or support exhaust gas reaction. Air delivery of the pump relative to engine rpm is given in Figure 39.

In order to find the optimum air flow required to sustain exhaust gas reaction, compressed shop air was regulated through a flowmeter into the exhaust sparger tube. Using the undiluted emission concentration of CO_2 during steady-states as an indicator, reaction was noted at 32 kph (20 mph) in second gear and at 48 kph (30 mph) in fourth gear. Figure 40 shows CO_2 plotted

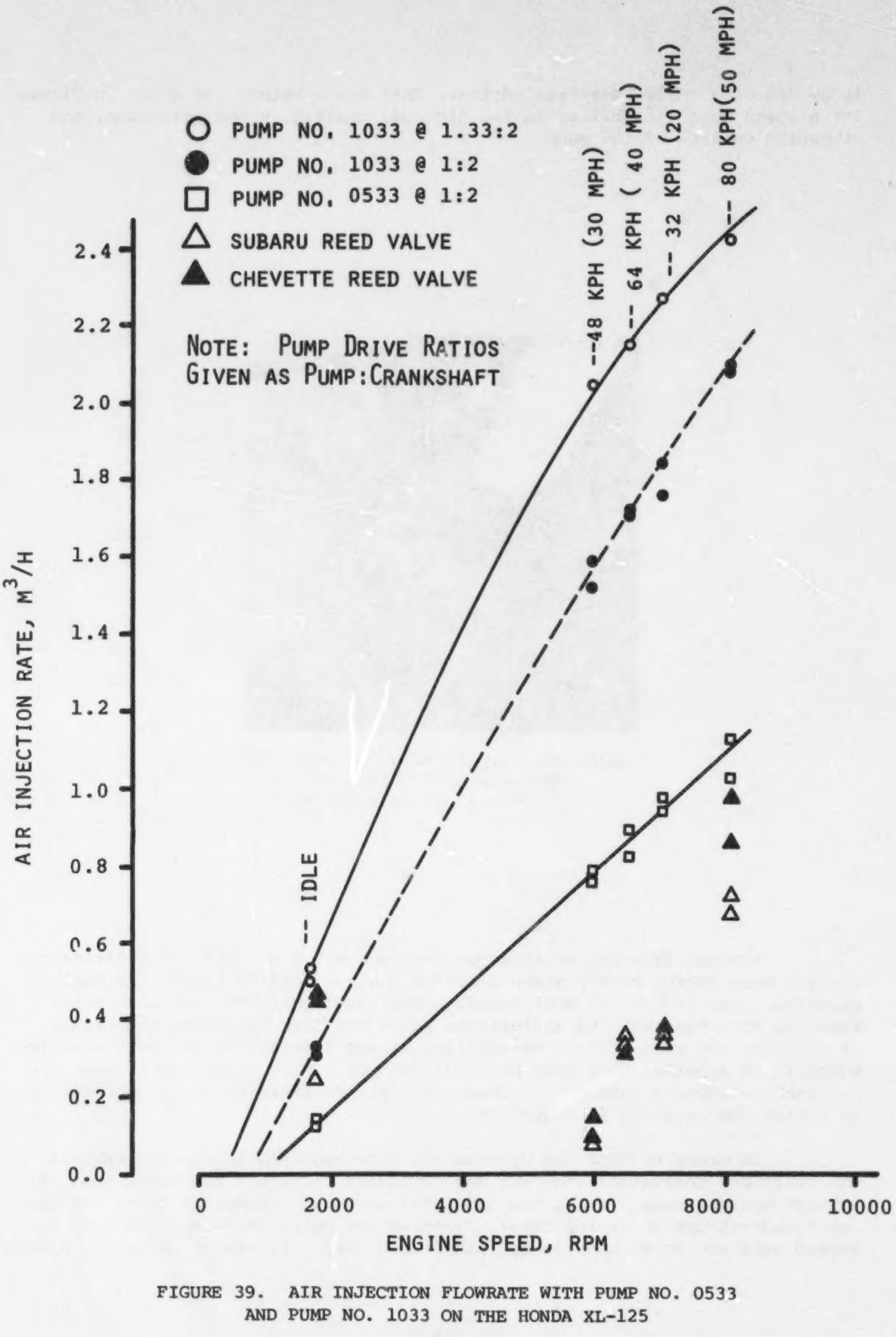


FIGURE 39. AIR INJECTION FLOWRATE WITH PUMP NO. 0533 AND PUMP NO. 1033 ON THE HONDA XL-125

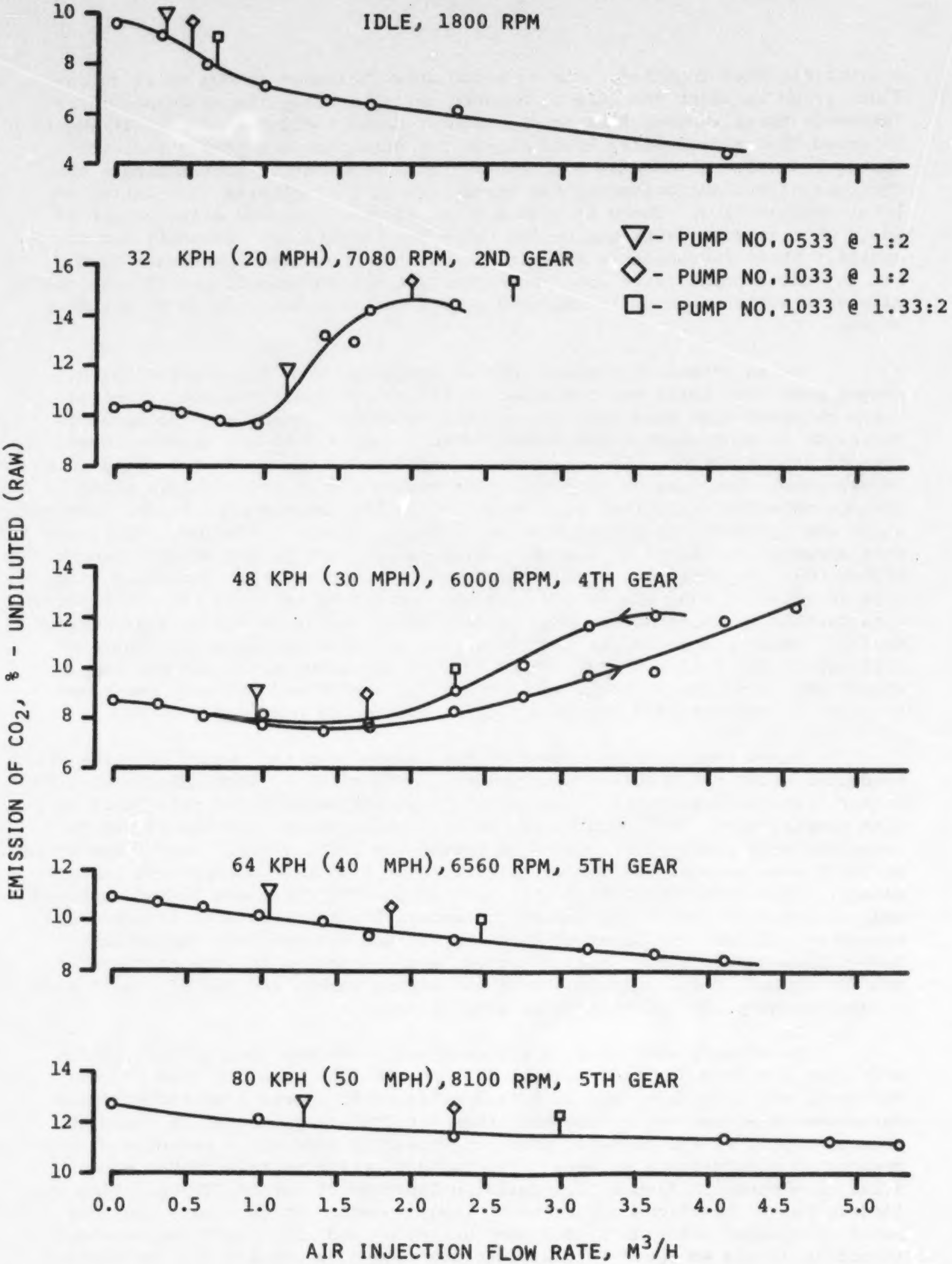


FIGURE 40. EMISSION OF CO_2 FROM HONDA XL-125 WITH AIR INJECTION VARIATION

against air flow injected. Curves which show increases in CO_2 emission reflect areas in which the rate of exhaust oxidation reaction increased in relation to total exhaust flow (combustion products + dilution air). It should be noted that a decreasing trend in raw CO_2 does not necessarily indicate that a reduction in exhaust reaction has occurred, but it does indicate that the rate of exhaust oxidation has stabilized or is declining in relation to total exhaust flow. There is also a point at which so much dilution air is added that exhaust gases are cooled below the temperature necessary for reaction. Sharp increases in exhaust temperature (measured downstream of the air injection point) were noted when reaction was sustained. At 48 kph, the rate of reaction apparently improved as air addition was reduced from higher values.

In an effort to optimize air injection by pump for the XL-125, a larger pump (No. 1033) was installed on the motorcycle. The air injection rates obtained with this pump are plotted in Figure 39 and are indicated in Figure 40 to show where these flowrates fall compared to the range of compressed air injection. Steady-state sequence XLS-3 was conducted using this larger pump. Examination of temperature traces and an emission trace comparison show that reactions were occurring in the exhaust pipe header section, which was insulated to retain heat and promote exhaust oxidation. Reactions were apparent at 32 and 48 kph, as indicated by lower CO and HC and somewhat higher CO_2. In addition, variations in oxygen concentration indicated reaction at idle, 32 kph, and 48 kph. It was decided to increase the air injection rate further by changing the pump drive ratio from 1:2 to 1.33:2 (pump:crankshaft). These projected air pump flowrates are also indicated in Figure 40. Although it was felt that pump No. 1033 with 1:2 drive ratio did not supply enough air to maximize the possible reaction, an FTP and FET were performed in order to see what effect, if any, air addition by pump had thus far.

These test results showed little change from the return baseline run conducted after the maladjustment program. The results, although numerically better than the new baseline, are within test variability for this small engine displacement. FET results are difficult to compare for the XL-125 because the head temperature tended to exceed the 250°C limit. Head temperature of 260°C were encountered for short periods of time with no apparent engine damage. This problem required that some of the FET cycle not be run as plotted, in order to reduce the operating temperature to acceptable levels. Although no reaction was apparent from the FTP and FET results, the exhaust temperature traces showed that reactions were occurring in some sections of the FTP cycle. These reactions were not strong enough and did not react over a long enough period of time to be significant.

As already mentioned, a higher-speed drive was used in conjunction with Gast air pump No. 1033 installed on the XL-125. Results from FTP and FET tests run with this pump at 1.33:2 drive ratio showed some reduction in emissions of HC and CO. These and other results are presented in Table 26. Reduced copies of the computer printout appear in Appendix D preceded by corresponding steady-state results. Pump output utilizing this higher speed drive is plotted in Figure 39. Emission improvement during FTP operation was largely due to reactions occurring at lower speeds. Steady-state sequence XLS-4, conducted with the 1.33:2 pump drive, showed that reactions were obtained at 32 and 48 kph. Road evaluations showed no significant degradation of performance although wide open throttle acceleration time (0-80 kph) increased from 10.2 (initial baseline) to 11.8 seconds.

TABLE 26. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE HONDA XL-125

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Return	0.74	13.35	40.23	0.16	37.2	0.56	8.82	50.33	0.64	35.3
+ Air (Pump 1:2)	0.63	12.77	36.69	0.14	40.2	0.45	11.45	46.01	0.70	35.6
+ Air (Pump 1.33:2)	0.55	9.17	39.96	0.14	42.0	0.37	8.68	47.17	0.75	37.6
	0.58	10.79	42.51	0.12	38.5	0.41	9.73	48.95	0.73	35.5
+ Air (Reed)	0.73	13.59	35.26	0.12	40.1	0.46	9.25	48.29	0.80	36.2
	0.77	16.34	36.56	0.12	36.6	0.53	9.84	47.54	0.75	36.0

Having reached the optimum air injection rate by pump, reed valves were tried to see what effect they had on the emissions. Results from flow checks of both the Chevette and the Subaru reed valves are indicated on Figure 39. The Chevette reed valve was selected due to its higher flowrates at lower speeds. Steady-state sequences XLS-5a and XLS-5b were generated by blocking and unblocking the intake to the reed valve, respectively. Raw emissions were sampled and exhaust temperatures recorded. These data indicated that exhaust oxidation took place at idle and 32 kph. Two FTPs and two FETs were conducted with the Chevette reed valve. No improvement over baseline was realized from the marginal amount of air inducted into the exhaust stream. These data were also complicated by the fact that the carburetor began to show signs of degradation such that the engine would falter just as the throttle was opened from idle. No carburetor maintenance was performed at this time because it would have made even marginal comparisons impossible.

In preparation for minor carburetor enleanment and addition of CDI, the carburetor was cleaned and reset (lean) following the tests with air injection by reed valve. The jet needle clip position was moved from the second position to the first (top) position, and the pilot air system was adjusted out to one and one eighth turn from bottom seat. A Mototek CDI system was then installed. Some installation problems were encountered in maintaining adequate timing control, because the system utilized signals from the stator winding to trigger firing time. In addition, the unit's "black box" has an electronic advance mechanism which did not provide as much advance as the stock system used on the XL-125. Consequently, the timing was advanced at idle and the lower speeds in order to provide enough advance above 3000 rpm. This process necessitated trial-and-error positioning of the flywheel in order to cause adequate high speed timing advance. The final flywheel positioning or timing was selected to give the best road performance.

Steady-state sequence XLS-6 was performed without air addition. Results showed an increase in HC and a decrease in CO. This change was attributed primarily to the timing, but carburetor adjustments certainly affected the results. Steady-states were then run with air injection by pump using the latest setup. Temperature data showed exhaust reaction occurring at most speeds, with the exhaust temperatures well above any previous test results.

Two FTPs and two FETs were conducted with the XL-125 utilizing air injection by pump, capacitive-discharge ignition, and carburetor adjusted lean. The results given in Table 27 indicate decreases in HC and CO as a result of the aforementioned measures. Thermal reactions within the first 25 cm (10 in.) of exhaust pipe were indicated strongly by very high exhaust gas temperatures recorded during both FTP and FET testing. Fuel economy results, along with the steady-state data, indicate that the change in timing (advanced-low speed, retarded-high speed), carburetor maintenance, and subsequent lean adjustment may have had compensating effects which enabled air injection to contribute significantly to lower emissions.

TABLE 27. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE HONDA XL-125

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Air (Pump No. 1033 @ 1.33:2) + CDI + Lean	0.54 0.54	7.32 6.97	50.46 47.91	0.17 0.14	37.0 38.9	0.26 0.22	6.62 5.38	61.84 56.10	0.62 0.56	31.9 35.7
Lean + Catalyst + Air (Pump No. 1533 @ 1.33:2) - CDI	0.10 0.09	0.68 1.02	52.75 61.28	0.18 0.16	43.3 37.1	0.03 0.03	1.58 0.90	63.87 65.10	0.75 0.86	35.0 35.0

Following these scheduled emission control measures, an extra step was taken to reduce emissions from this 4-stroke machine. A PTX-313 Engelhard catalyst, as described in the discussion of the Honda CB-360, was installed approximately 36 cm (14 in.) downstream of the exhaust port. The ignition was converted back to the stock system, so the influence of retarded high speed operation would be eliminated and no air was injected into the exhaust. Prior to steady-state testing, the vehicle was operated over the first 1371 sec of the FTP for catalyst preparation. It was noted that catalyst light-off did not occur. Further testing at steady-state conditions showed no catalytic reactions occurred without air addition.

Steady-states with the addition of compressed air were conducted, and a Gast No. 1533 air pump (driven at 1.33:2) was selected to provide approximately 2.9 m^3/h (1.7 cfm) of air at 64 kph (40 mph). Emission results from steady-state sequence XLS-8, along with corresponding air injection rates and catalyst temperature data, are given in Appendix D. The results of two FTPs and two FETs conducted in this configuration (shown in Figure 41) are presented in Table 27. Very good reductions in HC and CO were observed. Road evaluation performance was "good", although heat from the catalyst was uncomfortable to the driver's leg (no heat shielding used). WOT acceleration from 0-80 kph remained approximately 11.8 seconds.

FIGURE 41. CATALYST INSTALLATION ON HONDA XL-125

4. Suzuki RE-5

A baseline steady-state sequence (RES-1) was conducted on the Suzuki RE-5 (rotary engine) in preparation for air injection. Raw emission data were taken approximately 1 m downstream of the CVS connection to the exhaust pipes. The relatively low CO_2 and the high oxygen were the result of exhaust dilution by air inducted into the exhaust system. The RE-5 uses an air induction system to provide a cooling air flow between the internal exhaust pipe and the chrome plated exterior pipe. The air flow protects the rider from the hot interior exhaust pipes and prevents chrome discoloration. Cooling air is inducted by a venturi section located within the exhaust pipes about 35 cm upstream of the normal tailpipe exit.

In preparation for exhaust air injection, long sparger tubes 9.4 mm (3/8 in.) in diameter were installed so that their tips could be repositioned to optimize exhaust reaction at the greatest distance from the exhaust port. Distance from the exhaust port was of concern because data from baseline FTPs and FETs showed relatively high HC and CO emissions along with very high exhaust gas temperatures. These pollutants were expected to react vigorously with injected air, causing a "blow torch" effect in the exhaust pipe which could cause heat damage to the exhaust port or trochoidal housing if the reaction occurred near the exhaust port. Figure 42 shows the right air injection probe in position. Note the outer pipe cutaway and the cooling fins on the exhaust port casting used to conduct exhaust heat away from the engine.

Compressed shop air was added to the exhaust through the two sparger tubes, which were positioned so that their tips were even with the exhaust pipe connectors. Dilute emissions were measured to reduce the "masking" effect of both inducted tailpipe air and injected air on any exhaust reactions present. A simple schematic of the air injection test configuration used is shown in Figure 43.

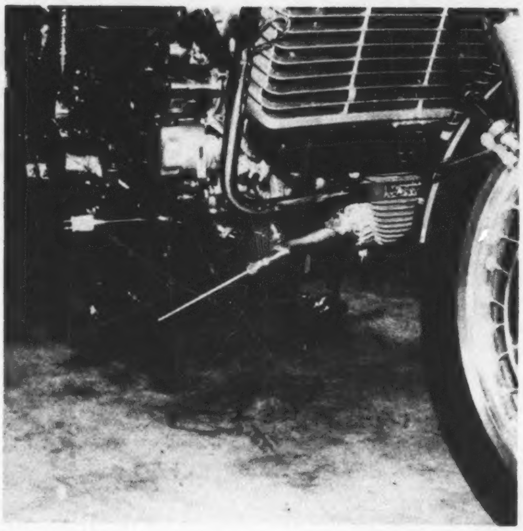


FIGURE 42. RE-5 WITH AIR INJECTION PROBE AND EXTERIOR PIPE CUTAWAY

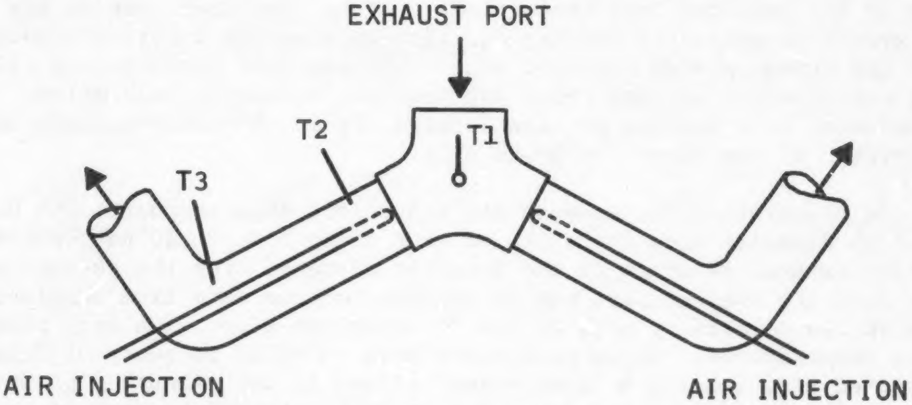


FIGURE 43. DIAGRAM OF AIR INJECTION TEST CONFIGURATION

With air injected into the system in increments up to 4.1 m^3/h (2.4 cfm), no significant reaction was noted at any speed. Exhaust gas temperature declined as air was added during idle, 32 kph and 48 kph. At 64 kph, some reaction was indicated by a slight increase in exhaust gas temperatures; but the changes in dilute emissions were questionable due to engine misfire.

Misfiring was most prevalent at 64 kph (40 mph), decreasing at the higher speeds (80 and 97 kph). As the rate of air injection was increased (at 64 kph), misfiring also increased.

At 80 and 97 kph, exhaust gas temperature at station T_2 was greater than or equal to that of station T_1 without air addition. When air was injected at these speeds, the temperature at station T_2 fell below that at station T_1 even though the temperature at station T_1 remained stable. No increases in temperature were noted downstream of station T_1 with air injected.

Both injection probes were advanced 2.5 cm upstream, and the previous air injection rates were repeated with no significant reaction apparent from exhaust temperature or undiluted emission data. Greater amounts of air were injected in an effort to see if there was a threshold requirement before reaction could start. The probes were moved to their original position and air injection rates were varied up to approximately 19 m^3/h (11 cfm). Again, no significant reaction was noted at most speeds, although minor reaction was indicated at 64 kph with air injection rates between 1.7 and 3.4 m^3/h (1 to 2 cfm). As before, misfiring increased at 64 kph as air injection was increased. The spaces between the double-wall exhaust pipes, where air was allowed to enter, were blocked off. Air injection was repeated with essentially the same (negligible reaction) results as before.

The misfiring noted during the 64 kph (40 mph) steady-states may have been a result of carburetor circuit transition from primary intake ports to the secondary intake port. No significant misfire occurred during transient operation; but it was noted that after the 64 kph steady-state was held for approximately 20 sec, misfire would occur. The rate of misfire seemed proportional to the amount of disturbance to backpressure caused by air injection. A new spark plug was installed, but the misfiring was still apparent at 64 kph.

Further testing of air injection for the first step control measure was limited to experiments with the Subaru reed valve. Inducting air with reed valves was expected to work quite well on the rotary engine due to the sharp exhaust pulses generated. It was hoped that the small charges of air supplied by the reed valve induction method might "fit" between stratified exhaust charges of overscavenged gases creating flame fronts to light-off after reactions. With the Subaru reed valve attached to both air injection probes, the probe tips were positioned as close to the exhaust port as possible, yielding the highest reed valve inlet vacuum. Figure 44 shows the results of air flow measurements taken during steady-state operation. No exhaust reactions were observed during steady-states using reed valve air induction.

FTPs and FETs were not conducted with air injection by reed valve due to the relatively small quantities of air inducted compared to compressed air injection (which itself showed insignificant results). Emission control by air addition alone was, therefore, abandoned; and preparations for the installation of catalysts were initiated.

Two Engelhard PTX-313 catalysts were welded into the two pipe exhaust system of the RE-5 approximately 45 cm (18 in.) downstream of the exhaust port as shown by Figure 45. Each catalyst had a loading of 1.77 kg/m^3 (50 g/ft^3)

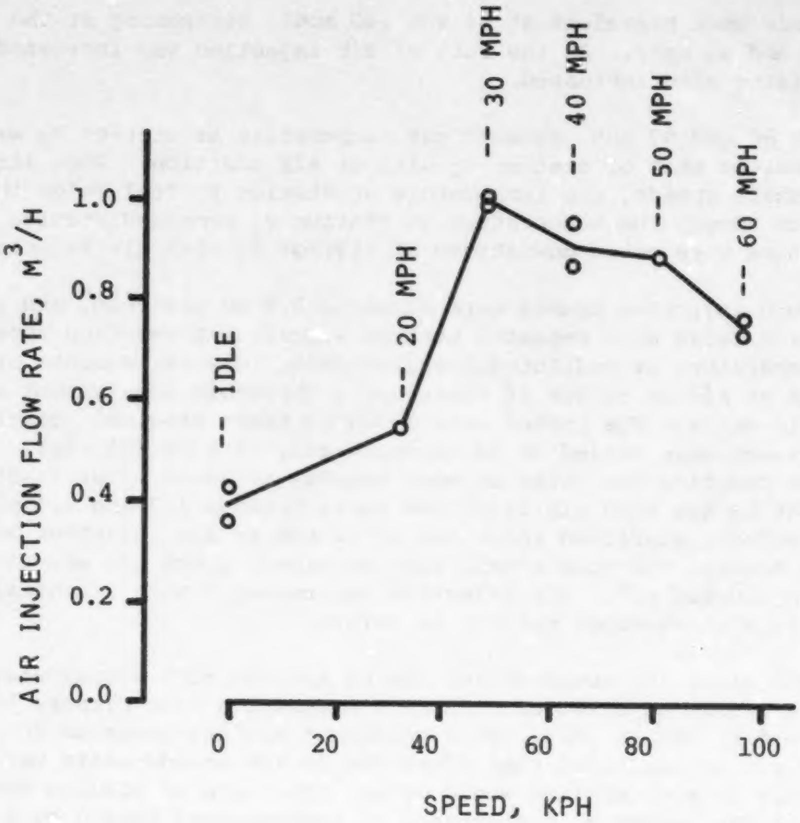


FIGURE 44. AIR INJECTION FLOWRATE INTO RE-5 EXHAUST VIA SUBARU REED VALVE (PROBES FULL IN, BOTH REEDS ACTIVE)

FIGURE 45. CATALYSTS AND AIR INJECTION ON THE SUZUKI RE-5

platinum-palladium mixture (ratio unknown), deposited on NGK substrate with 41 hexagonal cells/cm^2 (265 cell/in.^{2}). Active volume of each catalyst was 216 cm^3 (13.2 in.^{3}). Steady-state sequence RES-2 and a corresponding FTP and FET were conducted without air addition. Results showed significant reductions in HC with very little change in CO. A decrease in NO_x was caused by the reducing-atmosphere created by the operation of the catalyst with minimal oxygen present. The relatively high oxygen concentrations apparent during RES-2 are a result of dilution air entering the exhaust "cooling" system. Results recorded for RES-3 are also without air injection. The difference between the results of RES-2 and RES-3 is due to blocking of the tailpipe cooling air during the latter resulting in lower O_2 concentrations. All FTPs and FETs were conducted with the exhaust cooling air induction system operational.

Based on compressed air injection ahead of the catalyst, pump No. 0440 driven at 1:2 (pump:crankshaft) was selected to provide optimum catalyst reaction. Sequence RES-4 was conducted with injection air supplied by pump, while the tailpipe air induction system was inactive. Considerable reductions in CO and HC emissions were observed. Air injection rates used at the various steady-state speeds were also recorded and are given with the RES-4 data. Two FTPs and two FETs were conducted, and the results of these tests are presented below in Table 28. Both FTP and FET results showed dramatic reductions in HC and CO as a result of catalyst and air injection. Backpressure increase and air pump power requirements caused a slight increase in WOT acceleration time, from 6.8 to 7.1 sec. No significant degradation in performance was noticed during road evaluations. These tests concluded control measures to be applied to the RE-5.

TABLE 28. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE KAWASAKI KZ-900

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.	6.34	22.72	138.29	0.21	12.2	2.06	6.88	105.49	0.37	19.0
+ Catalyst Only	3.28	21.23	159.45	0.08	11.6	0.81	5.99	125.83	0.17	16.9
Catalyst + Air (Pump 0440 @ 1:2)	0.65	4.78	177.97	0.19	12.5	0.35	1.02	130.63	0.44	17.5
	0.51	4.01	168.31	0.18	13.3	0.30	0.86	119.72	0.42	19.1

5. Honda GL-1000

The first step control measure for the GL-1000 was to inject air in an effort to reduce emission of HC and CO. Sparger tubes of 7.8 mm (5/16 in.) diameter were installed in each cylinder's exhaust pipe so that the probe tips were approximately 2.5 cm downstream of the exhaust port. Compressed air was fed into these tubes by a common manifold. Dilute emissions and exhaust temperatures were monitored. With air being forced into the exhaust stream, reaction was noted during idle operation about the point where the two right side exhaust pipes join (noted by temperature data). This reaction at idle began with approximately 0.7 m^3/h (0.4 cfm) added air, increasing gradually as more air was injected. The maximum temperature change observed with 1.4 m^3/h (0.8 cfm) air added to each pipe was only 40°C, which implied that the rate of reaction was relatively small. Negligible reaction occurred at 32 kph (20 mph) and no reaction was noted from 48 to 97 kph (30 to 60 mph) inclusive. Air was then fed to only the two right exhaust pipes, as shown in Figure 46, in an effort to increase the per cylinder injection rate and determine reaction by temperature increases. Once again, reaction was noted at idle, beginning this time with air flowrates of 0.5 m^3/h (0.3 cfm) per cylinder and increasing to 1.2 m^3/h (0.7 cfm) per cylinder. Thereafter, additional air did not increase the reaction rate. Minor reaction was noted at 32 kph with 1.2 m^3/h (0.7 cfm) but did not increase with additional air. For speeds of 48 to 97 kph inclusive, cooling occurred rather than reaction. Maximum temperature rise at 32 kph was approximately 20°C.

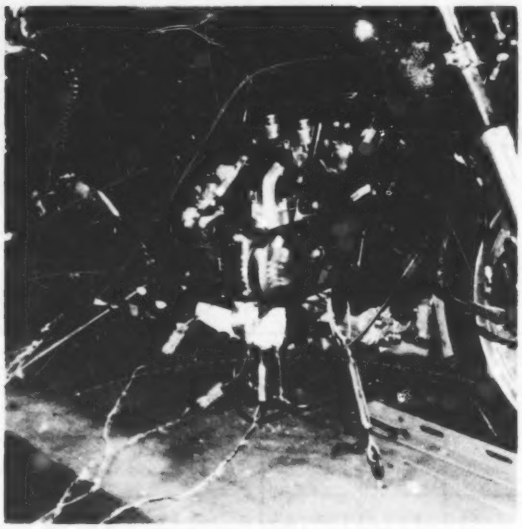


FIGURE 46. COMPRESSED AIR
INJECTION INTO GL-1000

From these modest results, it was concluded that the addition of an air pump would be superfluous. This decision took into account that the GL-1000's CO and HC emissions were relatively low in baseline condition.

The Chevette reed valves were installed so that one valve was used per air injection probe (or per cylinder). Flowrates for two cylinders were checked in order to help quantify the amount of air being injected by the total system. The two left side valves, with air flow measurement adapters attached, are shown in Figure 47. Air flowrates obtained from these two reed valves are graphically shown in Figure 48. It may be noted that although the reed valves are supposedly identical, minor differences in acoustics between cylinders, sparger tubes, and production reed valve tolerances led to different air induction rates. In addition, reed valves induct more air during decelerations than is represented by the steady-state data.

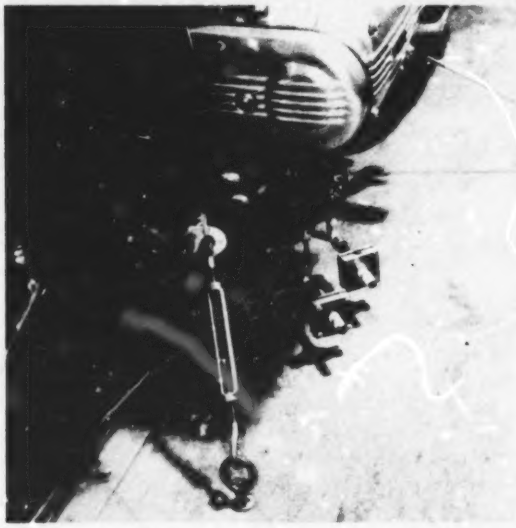


FIGURE 47. CHEVETTE REED VALVES INSTALLED ON GL-1000

An FTP and an FET were conducted with these reed valves installed and with the pipes insulated. As shown in Table 29, both the FTP and the FET indicated that some reaction took place; since HC and/or CO declined slightly while CO_2 increased. These small emission changes may be the result of test-to-test variability since only one test was run. Steady-state sequence GLS-2 showed lower concentrations of pollutants, but these decreases appeared at each test point and were probably attributable mostly to dilution. The possible exception to this generalization may be at idle and 32 kph, where both CO and HC decreased more sharply than could be accounted for by dilution alone.

TABLE 29. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE HONDA GL-1000

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.	2.79	11.23	113.42	0.38	16.9	0.64	4.21	87.41	0.55	24.2
Air (Chevette Reed Valves)	2.44	9.04	125.37	0.43	15.9	0.55	4.34	93.89	0.62	22.7

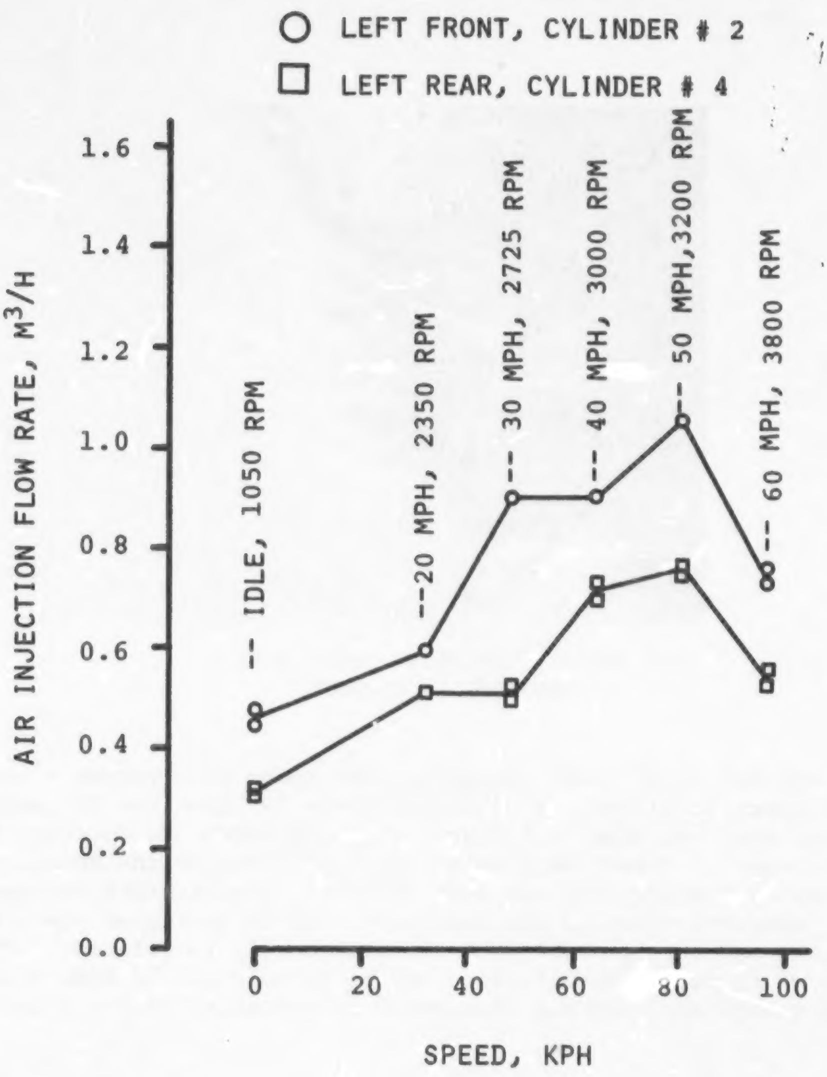


FIGURE 48. AIR INJECTION FLOWRATES OF TWO OF FOUR CHEVETTE REED VALVES MOUNTED ON THE HONDA GL-1000

More testing could have been done with air injection on the GL-1000, but the initial results implied that the improvements would be relatively minor. No further testing of air injection alone was conducted.

Two Engelhard PTX-413 catalysts were installed between the muffler and header pipes of the GL-1000, as shown in Figure 49 (catalysts described in KZ-900 discussion). These converters were secured with quick-connect clamps so that other catalyst cores could be substituted easily if needed. Thermocouples were positioned so that the exposed tips were within 2.5 cm of the catalyst core entrance and exit (this was the typical placement of thermocouples whenever Engelhard catalysts were used). Steady-state sequence GLS-3 was conducted with these catalysts. No air was added to the exhaust during this sequence. An FTP and an FET were conducted with the motorcycle in this configuration, and these results are given in Table 30. Major reductions in CO and HC were attained during FTP operation, but results of FET operation were less substantial. Data from GLS-3 indicated a lack of oxygen at the higher speeds. The addition of air was thus expected to improve both transient test results. No increase in WOT (0-100 kph) acceleration time was noted with catalysts in place.

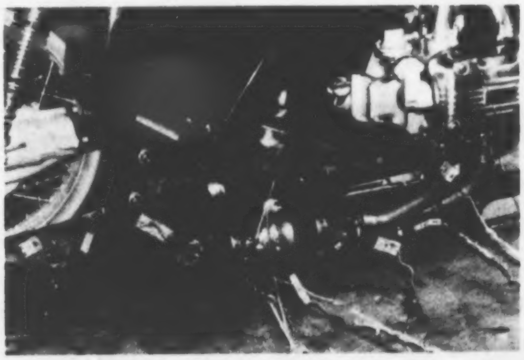


FIGURE 49. CATALYST INSTALLATION ON GL-1000

TABLE 30. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE HONDA GL-1000

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.	2.79	11.23	113.42	0.38	16.9	0.64	4.21	87.41	0.55	24.2
Catalysts Only	0.50	3.90	143.16	0.20	15.6	0.24	3.23	97.42	0.19	22.6
Catalysts + Air (Pump 1033 @ 1:1)	0.29	2.07	139.86	0.25	16.3	0.14	0.96	96.65	0.37	23.6
	0.36	2.15	143.68	0.26	15.8	0.11	1.15	97.49	0.33	23.4

Compressed air was injected into the exhaust system, ahead of the catalysts, during steady-state operation in order to size the air pump required for most effective control. Relatively small amounts of air were needed to oxidize the remaining CO and to achieve some further control of HC. A Chevette reed valve was attached to each exhaust port via a tube in an effort to provide air. Results from air flow measurements showed an average total induction rate of 1.1 m^3/h (0.65 cfm) at each speed. Steady-state sequence GLS-4 was conducted with the reed valves. The catalyst and reed valve combination appeared to be quite effective, although previous tests indicated that more air was needed for optimum catalyst performance.

As shown in Figure 50, a Gast No. 1033 pump was selected and installed with a 1:1 drive ratio (pump:crankshaft) driven from the left side overhead cam drive of the GL-1000. Results from steady-state operation are given in Appendix D as sequence GLS-5. Air flows corresponding to the various speeds are also given on this data sheet. Road evaluations presented in Appendix B show little change in performance, although some uncomfortable heat was noted from the catalysts. WOT acceleration performance changed only slightly. The results of FTPs and FETs conducted with the motorcycle in this configuration are given in Table 30. These data indicate that catalysts and air (combined) produced even further reductions in CO and HC as compared to catalysts alone. These tests concluded emission control measures to be applied to the GL-1000.

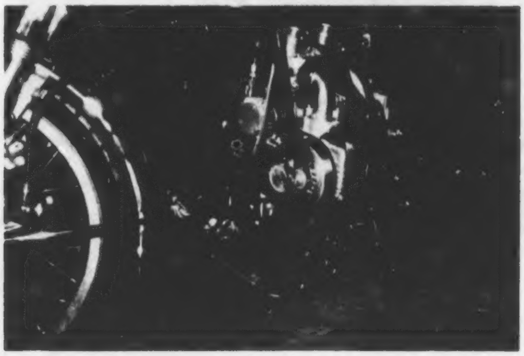


FIGURE 50. AIR INJECTION AND CATALYST INSTALLATION ON GL-1000

6. Yamaha RD-400

The first control measure applied to the Yamaha RD-400 was the addition of catalysts with air. Two types of catalysts were supplied by Matsushita Electric Industrial Company, Ltd. (through EPA) for test with the RD-400. Two pairs of RD-400 exhaust systems were received with "cloth catalyst" segments welded into the muffler sections approximately 38 cm (15 in.) upstream of the exit end of the muffler. Catalyst-muffler weldments, shown in Figure 51, were designated as set No. 3001 and set No. 3002. Each of set No. 3001 were described as "type MCC" formed of "silica-cloth" substrate with a catalyst "volume" of 0.3 m^2 (3.2 ft^2) utilizing a platinum (and proprietary substance) loading of 3 g/m^2 (0.28 g/ft^2). Each of set No. 3002 were described as "type PTC" formed of "silica-cloth" substrate with a catalyst "volume" of 0.7 m^2 (7.5 ft^2) utilizing a platinum (and proprietary substance) loading of 3 g/m^2 (0.28 g/ft^2). Catalyst "volume" and loading were not given in cm^3 and g/cm^3 respectively, because the catalysts are formed from "flexible and soft cloth" materials. Thermocouples were installed in the Matsushita units in the same positions as the original pipes, with the exception that thermocouples were placed 7.6 cm (3 in.) either side of the catalysts.

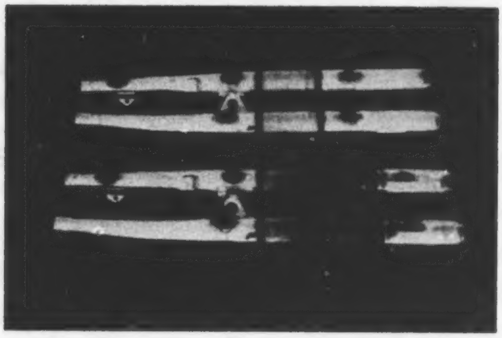


FIGURE 51. CATALYST SET FOR
THE YAMAHA RD-400
SET NO. 3001 (TOP)
SET NO. 3002 (BOTTOM)

Steady-states conducted on the RD-400 using both catalysts supplied by Matsushita are presented in Appendix D as RDS-2 and RDS-3. Raw emission data were taken after the catalysts were "prepped" by operation over the first 1371 sec of the FTP. Sequence RDS-2 was conducted with set No. 3001, while sequence RDS-3 was run with set No. 3002 catalysts. Both types of catalysts proved very effective in the oxidation of CO and HC with no addition of air. Catalyst set No. 3002 was selected for use with air injection on the basis of their greater effectiveness in oxidizing HC, although its CO oxidation performance appeared less efficient without air addition than catalyst set No. 3001. Levels of oxygen emitted were also much lower for catalyst set No. 3002, implying that more reaction would occur if the oxygen were available.

Original header pipes were modified by adding sparger tubes 9.5 mm (3/8 in.) in diameter which extended about 1.3 cm (0.5 in.) beyond the exhaust header into the exhaust port head cavity. Air flow measurements were made on all three types of reed valves, with the stock mufflers and sparger tubes. Results for one active reed are given in Figure 52. The Subaru reed valve was selected for air injection because it provided more air flow for the higher engine speeds at which sequence RDS-3 indicated oxygen deficiency.

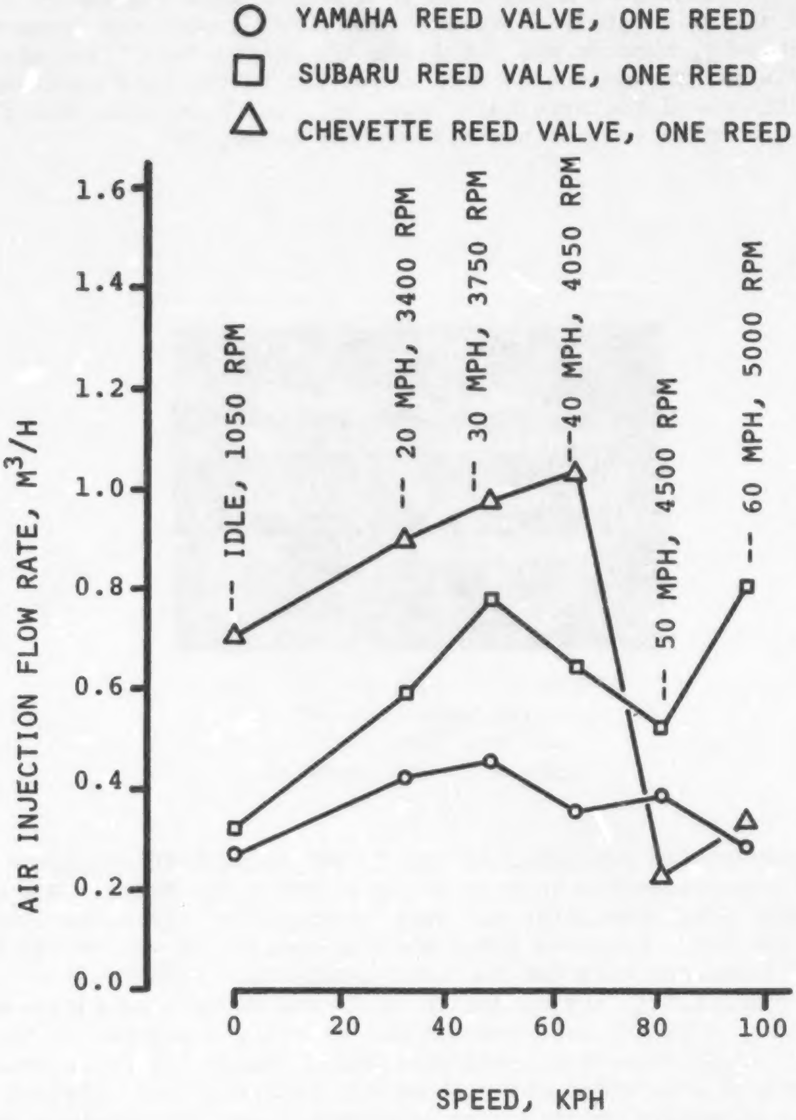


FIGURE 52. AIR INJECTION FLOWRATES INTO ONE PIPE OF YAMAHA RD-400, WITH STOCK MUFFLER, 9.5 MM SPARGER TUBE

Figure 53 shows the Subaru reed valve connected to the motorcycle's sparger tubes via 9.5 mm diameter stainless tubing. The valve was mounted between the two motorcycle exhaust pipes so that each side of the reed valve assembly fed one cylinder's exhaust. About 50 cm (20 in.) of tubing was curved around the pipe to complete the connection from each side of the reed valve to the corresponding sparger tube. Air flowrates taken during subsequent steady-state operation showed that the Subaru reed valve admitted more air than the previous data had indicated.

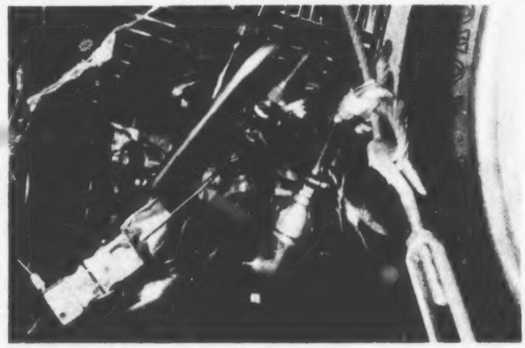


FIGURE 53. AIR INDUCTION SETUP ON RD-400 USING THE SUBARU REED VALVE

The Matsushita catalyst set No. 3002 and Subaru reed valve were mounted on the RD-400. Steady-state sequence RDS-4 was performed with the motorcycle in this configuration. The results indicated that very good oxidation occurred within the catalyst, reducing the CO and HC drastically from the uncontrolled state. After accidentally operating the motorcycle through a cold start 505 second (portion of the FTP) with the choke on, the catalyst segments became red hot before the engine was shut down. Steady-state sequence RDS-5 was conducted to establish whether or not any catalyst damage occurred. The catalyst operation appeared to have improved. More catalytic sites may have been opened by the high temperatures reached.

FTPs and FETs were then conducted with catalyst set No. 3002 and the Subaru reed valve, and the results appear in Table 31. Both FTPs and FETs showed dramatic reductions in HC and CO. WOT acceleration testing and road evaluations showed little change in performance.

TABLE 31. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE YAMAHA RD-400

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.	10.32	12.62	58.23	0.03	21.3	4.79	10.72	54.64	0.04	26.9
Catalyst Set No. 3002 + Subaru Reed Value	1.21	3.25	94.82	0.01	22.6	0.43	4.74	77.94	0.02	26.8
	1.07	2.44	92.14	0.02	23.6	0.48	5.03	80.43	0.02	25.9

Following FTP and FET tests, the reed valve was replaced with regulated compressed air so that the effect of interaction between air injection and catalyst could be determined. Dilute emissions were sampled while the rate of air injection was varied. The results from these tests are best represented by plots of the change in HC as more air was provided. These plots are given as Figure 54. The temperatures indicated with each plot are the maximum exhaust gas temperatures as measured before and after the catalyst weldments. Air flow obtained with the Subaru reed valve and the air that could be injected by a Gast No. 1033 pump driven at crankshaft speed have been superimposed on the HC plots.

The reed valve surpassed the capability of the air pump at idle but falls short of the pump at the other speeds. This shortcoming is not pronounced within the operating speed range of the FTP and FET. In addition, the reed valve operation is within the most efficient oxidizing range of the catalyst at the lower speeds. Based on these results, no further tests of catalyst with air addition were conducted; however, additional air would have reduced HC and CO emission further.

After studying temperature data obtained from various tests with the RD-400, it was decided that the most advantageous approach to thermal reactors would be to localize the reaction within the first 25 cm (10 in.) of the exhaust pipe. Low exhaust gas temperature was the main obstacle in initiating or sustaining thermal oxidation of the exhaust gases in this case. First considerations involved the use of canisters similar to those initially used on the Honda CB-360, but they had the drawback of modifying the acoustic properties of the exhaust system. The decision was made to heavily insulate the first 38 cm (15 in.) of each exhaust pipe as shown in Figure 55. Asbestos gaskets were also used to replace the standard copper crush gasket used between the head and exhaust pipe. The outer (insulated surface was only hot

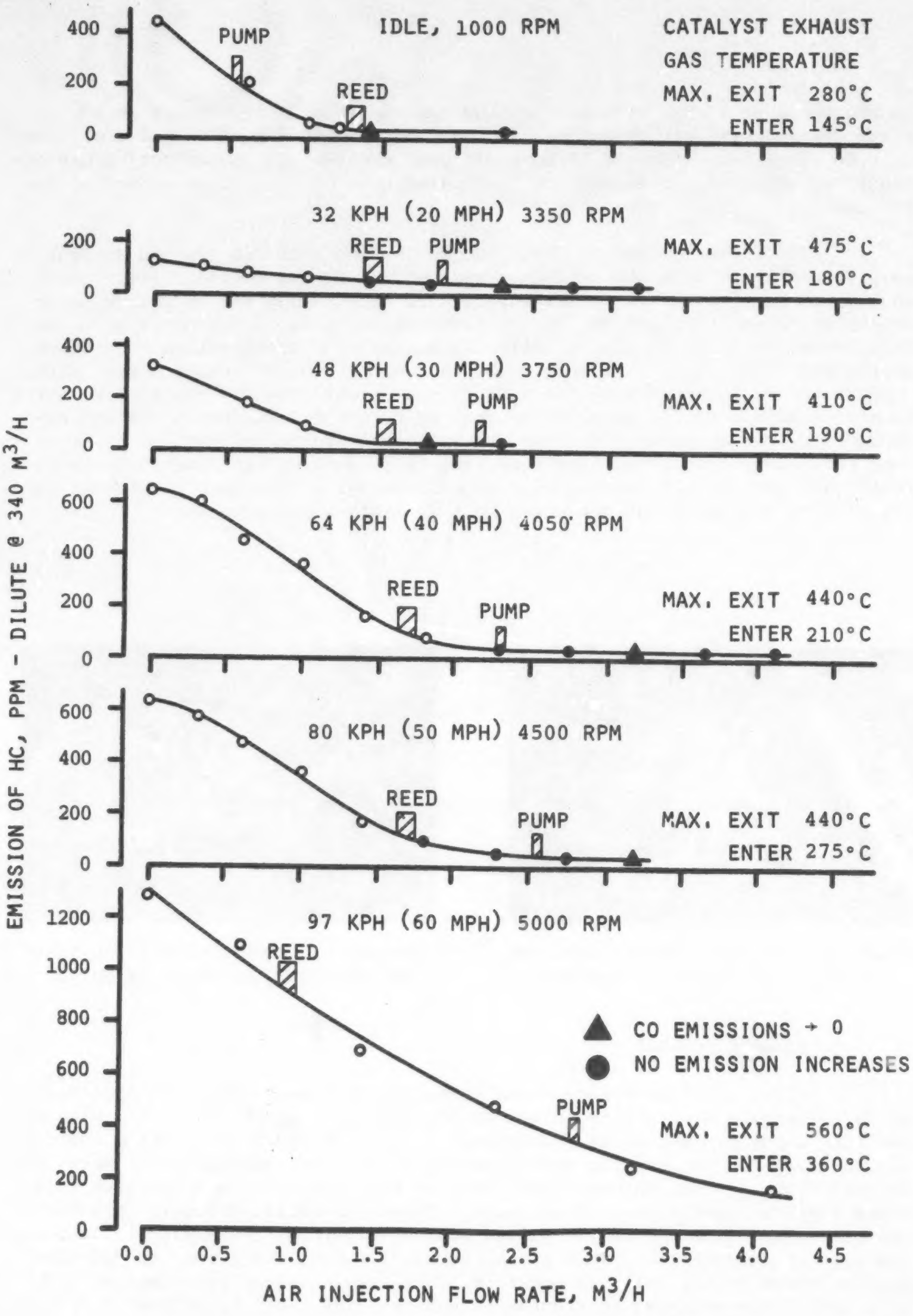


FIGURE 54. OXIDATION OF HC USING AIR INJECTION VARIATION WITH CATALYST NO. 3002 ON THE YAMAHA RD-400

to the touch at 97 kph with the cooling fan operating. Subsequent steady-state testing with air injection varying from zero to 4.1 m^3/h (2.4 cfm) showed that no reactions occurred. Timing was then retarded 10° to effect higher exhaust temperatures. Steady-state testing of this configuration showed no improvement.

The thermal reactors used last on the Honda CB-360 (second design) were incorporated into the exhaust system of the Yamaha RD-400. After heavy insulation was applied to the exhaust header section and the thermal reactor bodies as shown in Figure 56, steady-state sequence RDS-6 was conducted. Results from RDS-6 showed slight shifts in HC and CO concentrations, but these shifts were attributed to backpressure influences. Other steady-states with compressed air injected into the exhaust system were run and recorded on strip chart. Analysis of the temperature and raw emission data showed that no exhaust reactions occurred with these thermal reactors in the system. A brief road performance check revealed that overall performance and particularly acceleration ability had deteriorated significantly. No further testing of exhaust after-treatment was performed on this 2-stroke motorcycle.

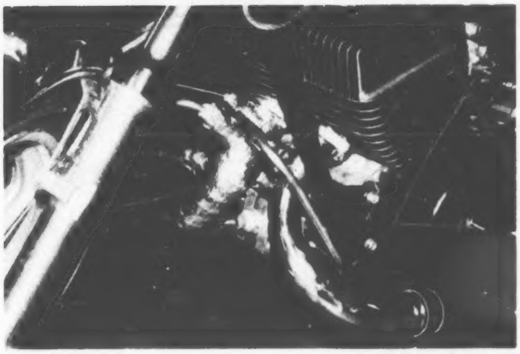


FIGURE 55. EXHAUST HEADER INSULATED TO SERVE AS A THERMAL REACTOR

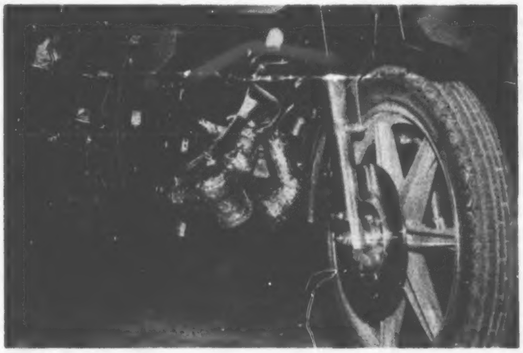


FIGURE 56. HEAVILY INSULATED THERMAL REACTORS INSTALLED ON RD-400

7. Kawasaki KH-500

After baseline steady-state sequence KHS-1 was completed, application of port liners and catalysts to the KH-500 was begun according to the plan of control measures. The heads and cylinders were removed to facilitate the fitting of port liners into the small exhaust ports. The exhaust ports were relatively short and had an oval shape next to the piston, with transition to a round shape to accept the exhaust pipe. First considerations were to extend the port liner into the triple-walled exhaust pipe, but the physical fit problem made it impractical. Thin stainless steel tubing was formed to fit the port as close to the walls as possible. The leading edges were tapered and bent into shape as shown in Figures 57 and 58. The final reduction of exhaust port area was estimated at about 12 percent.

FIGURE 57. FINISHED PORT LINER FOR KH-500

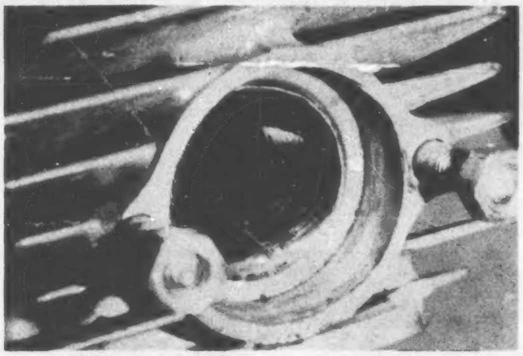


FIGURE 58. EXHAUST PORT LINER INSTALLED IN KH-500

After reassembly, the motorcycle was operated for 120 km (75 mi.) over a distance accumulation course in order to reseat the piston rings. Care had been taken not to rotate the rings when the cylinders were removed. After break-in, brief steady-states were conducted in this configuration with only temperatures being monitored. Exhaust gas temperatures from the exhaust ports were raised by approximately 10°C at idle to approximately 50°C at higher speeds.

Figure 59 shows the location of the catalyst segments, mounted approximately 45 cm (18 in.) downstream of the exhaust ports. The three exhaust pipes were dropped vertically about 7.6 cm (3 in.) by the addition of tubing to allow placement of the catalysts and an accompanying heat shield to divert heat generated by the catalysts from the crankcase. These Engelhard PTX 314 catalyst assemblies contained 2.5 cm (1 in.) of "Torvex" followed by 7.6 cm (3 in.) of Corning substrate (46.5 square cells/cm^2) packaged in a 7.6 cm (3 in.) diameter by 12.7 cm (5 in.) long cylinder. The active volume was 290 cm^3 (17.7 in.^{3}) with a loading of 1.77 kg/m^3 (50 g/ft^3) of platinum and palladium (ratio unknown). Figure 60 shows the "Torvex" end of the catalyst assembly.

Steady-state sequence KHS-3 was conducted after a prep run of the first 1371 sec of the FTP. These data showed a sharp decrease in the emission of HC, but this reduction was accompanied by a slight increase in CO. No air addition was used during this first step control measure. Temperature data from the steady-state sequence and subsequent catalyst operation showed that the three cylinders were not at the same air-fuel ratio (all carburetor settings were as-received).

FTP results showed a major reduction in HC, but as with steady-state data, this reduction was accompanied by a slight increase in CO. Fuel economy was approximately the same as for the uncontrolled motorcycle. Results from the FETs showed smaller decreases in HC and minor changes in CO. Fuel economy during the FETs was slightly lower than baseline, probably the result of increased backpressure caused by the catalyst and port liners. The extent to which the port liners contributed to emission control was probably minimal, because they increased exhaust temperature only slightly. WOT (0-100 kph) acceleration performance deteriorated from 6.7 to 9.3 sec. Road performance was also observed to deteriorate somewhat. Results of these emission tests are given in Table 32.

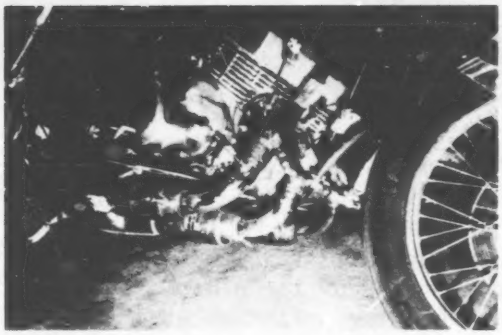


FIGURE 59. CATALYSTS AND HEAT SHIELD INSTALLED ON KH-500 (AIR INJECTION APPLIED AFTER FIRST STEP CONTROL)

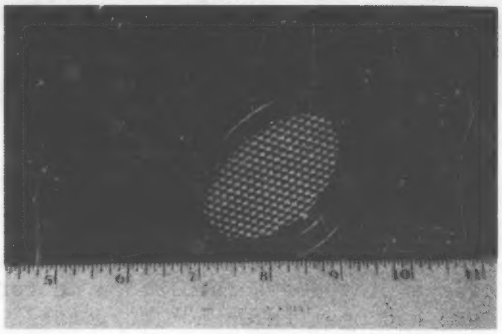


FIGURE 60. CYLINDRICAL CATALYST ASSEMBLY WITH "TORVEX" FORESECTION USED FOR 2-STROKE APPLICATION

TABLE 32. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE KAWASAKI KH-500

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Ave.	19.26	26.25	55.89	0.02	14.9	10.41	26.35	50.16	0.02	18.7
Catalysts + Port Liners	3.81	28.94	99.45	0.01	15.0	2.82	26.62	81.50	0.01	17.6
	4.27	28.24	98.17	0.01	15.1	2.94	26.07	81.68	0.01	17.6
Catalysts + P.L. + Lean Carb.s	2.37	7.28	106.75	0.05	18.7	0.62	1.18	90.64	0.16	24.6
	2.60	7.27	103.35	0.05	19.1	0.47	0.99	89.89	0.15	25.1

The second step control measure for the KH-500 was minor carburetor enleanment. In addition to the catalyst and the port liners already installed on this motorcycle, the three carburetors were leaned substantially. Based on road tests, the jet needle clip position was changed from the fourth to the first clip position (top), and the pilot air screws were turned out an additional one turn from the one and one half turn position. Vacuum alignment was set by the local dealer. These adjustments approached the "borderline lean limit" for performance.

Steady-state sequence KHS-4 showed reductions in CO and HC throughout, and larger reductions occurred with increasing engine speed. Significant reductions in HC and CO were also observed for transient tests. As with the steady-state results, the higher-average-speed FET yielded greater reductions than the lower-average-speed FTP. In addition, fuel economy showed a sharp increase. WOT (0-100 kph) acceleration time increased only slightly from 9.3 sec, with catalyst and port liners, to 10.3 sec with the addition of lean carburetion. Results from FTPs and FETs conducted in this configuration are presented in Table 32 along with some previous data for comparison.

Preparations for air injection through 7.9 mm (5/16 in.) diameter sparger tubes as the third step control measure were implemented. Figure 59 shows some of the air injection hardware in position. Steady-states were conducted with air rates from 0 to 4.1 m^3/h (2.4 cfm). During the 97 kph (60 mph) steady-state run (with air injection variations almost completed) the motorcycle engine siezed, locking the rear wheel. Engine teardown revealed that only the center piston had siezed as evidenced by the severe scuffing shown in Figures 61 and 62. The outer cylinders and pistons were determined to be undamaged. The center cylinder was inspected by the local dealer, and rework of that part was authorized. A new piston, wrist pin, and rings were used to complete repairs.

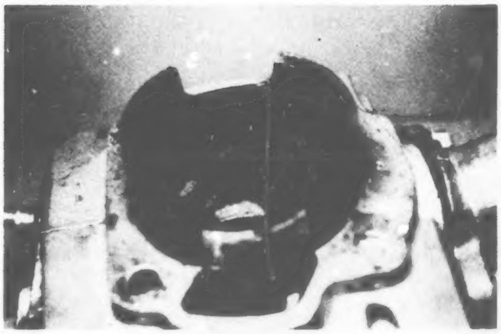


FIGURE 61. CENTER PISTON AFTER SEIZURE OF KH-500

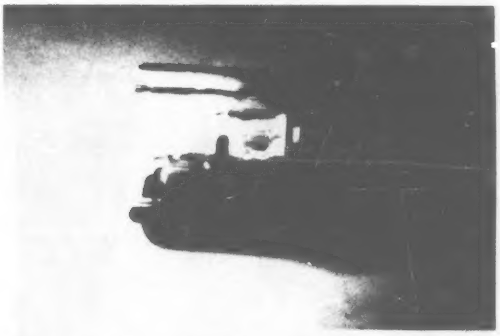


FIGURE 62. CENTER CYLINDER AFTER SEIZURE OF KH-500

Scuffing of the piston was evident around the entire circumference, and the wrist pin showed some "bluing" from the high temperatures reached. The failure was probably due to the relatively lean combustion mixture, but the amount of piston scuffing indicated that a lack of lubrication (in combination with injected air leaning the mixture further) may have contributed to pushing the parts over the temperature limit.

Head temperature data (taken by a thermocouple just under the spark plug) indicated that the temperature increased from 160°C to 225°C during the 97 kph (60 mph) steady-state, leveling off slightly when air injection reached approximately 2.2 m^3/h (1.3 cfm). Increased air injection above 2.2 m^3/h had increased head temperatures to 245°C when seizure took place.

After engine repairs were completed, the carburetors were set to the (richer) stock settings and a 480 km (300 mi) distance accumulation procedure for break-in was started. After approximately 240 km (150 mi), the motorcycle ran out of fuel and the operator tried to push-start the motorcycle before checking the fuel level. The KH-500 was refueled, and no driveability problems were apparent for the next 160 km (100 mi) of road work. A loss of power was then noted, and oil-carbon mix began to appear at the exhaust flange of the right cylinder's pipe. It was evident that the backpressure had increased, since engine performance had deteriorated rapidly with 440 km (275 mi) of total break-in accumulated.

Subsequent inspection of the right catalyst assembly (No. 1) showed that the "Torvex" was almost completely gone, as shown in Figure 63. Inspection of the other two catalysts showed similar signs of "burn-out". Substrates appeared to be intact although they were effectively plugged, as shown in Figure 64. All three catalysts were sent to Engelhard for detailed examination. Examination of the catalyst returned to Engelhard showed that the "Torvex" foresection failed as a result of thermal shock, resulting in disintegration which subsequently caused plugging of the aftsection catalyst substrate. Little catalyst damage or loss of activity was found, and no poisons were present. The analysis report from Engelhard is given in Appendix F.

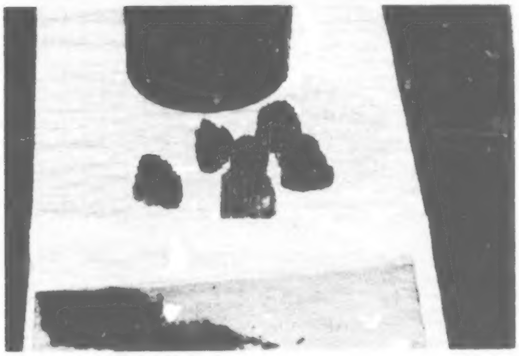


FIGURE 63. CATALYST FORESECTION BREAK-UP, "TORVEX"

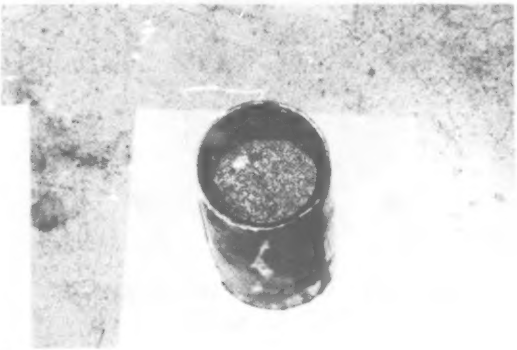


FIGURE 64. PLUGGING OF CATALYST AFTSECTION, CORNING SUBSTRATE

Three new catalysts (PTX 314 with "Torvex" and NGK substrate) were welded into the exhaust system. Steady-state sequence KHS-5 was conducted after approximately 40 km (25 mi) of road operation completed the engine break-in procedure. Comparing results of KHS-5 to KHS-3, run before seizure with PTX 314 (Corning substrate), KHS-5 showed similar CO but higher HC. Results from two FTPs and FETs conducted with these new catalysts and stock carburetion showed approximately the same emission rates as obtained with the previous (before seizure) catalyst material. Slightly better fuel economy was observed in the most recent test, probably as a result of a minor backpressure difference caused by different catalyst substrates. NGK substrate consisted of 41 hexagonal cells/cm^2 (265 cells/in.^{2}).

Following these tests, the carburetors were leaned. The outer two were set as before, but the inside carburetor's jet needle clip was moved from No. 4 to No. 2 position; and the pilot air screw was adjusted out two turns from bottom. Steady-state sequence KHS-6 was conducted after carburetor alignment. Emission rates of HC and CO were higher for this sequence than for sequence KHS-4 (before seizure), reflecting the richer carburetor setting of the middle cylinder and the different catalyst substrate. Results from transient test are given in Table 33. Although the previous levels of emission control were not reached, significant reductions in HC and CO were observed in the results of FTP and FET tests. Information obtained from the steady-states (before seizure) with various air injection rates indicated that air flows from 1.7 to 2.7 m^3/h should optimize catalyst performance from idle to 97 kph, respectively.

TABLE 33. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE KAWASAKI KH-500

Test Configuration	FTP Emission Rates, g/km					FET Emission Rates, g/km				Fuel Econ.
	HC	CO	CO$_2$	NO$_x$	km/ℓ	HC	CO	CO$_2$	NO$_x$	km/ℓ
Baseline Avg.	19.26	26.25	55.89	0.02	14.9	10.41	26.35	50.16	0.02	18.7
1st Catalyst + Port Liners	3.81 4.27	28.94 28.24	99.45 98.17	0.01 0.01	15.0 15.1	2.82 2.94	26.62 26.07	81.50 81.68	0.01 0.01	17.6 17.6
1st Catalysts + P.L. + Lean Carb.s	2.37 2.60	7.28 7.27	106.75 103.35	0.05 0.05	18.7 19.1	0.62 0.47	1.18 0.99	90.64 89.89	0.16 0.15	24.6 25.1
After Seizure										
2nd Catalyst + Port Liners	4.06 3.81	24.60 22.81	89.70 85.90	0.01 0.01	16.7 17.6	3.14 2.64	28.33 24.21	74.42 61.17	0.01 0.01	17.9 21.6
2nd Catalysts + P.L. + Lean Carb.s	2.23 2.42	9.60 9.77	96.81 108.25	0.01 0.03	19.8 17.9	0.77 0.70	2.80 2.65	83.63 86.58	0.03 0.05	25.7 25.0
2nd Catalysts + P.L. + Lean + Air	1.07 1.24	1.35 1.62	120.38 116.41	0.05 0.05	18.6 19.1	0.27 0.26	0.26 0.19	91.71 90.85	0.10 0.09	25.0 25.3

Air pump No. 1533 with a 1:1 drive ratio (pump:crankshaft) was selected for air injection. Steady-state sequence KHS-7 was run with the air pump installed and showed major reductions in both HC and CO emissions. Air was injected into the exhaust pipe approximately 15 cm (6 in.) downstream of the port, which was approximately 30 cm (12 in.) upstream of the catalyst. Sparger tubes were not used because it was felt that air addition in the exhaust port area would lean out the combustion mixture. As with steady-state results obtained in KHS-7, the FTP and FET results (given in Table 33) show large reductions in CO and HC. These tests concluded emission control measures to be applied to the KH-500.

8. Kawasaki KE-175

Baseline steady-state sequence KES-1 was conducted on the Kawasaki KE-175 in the stock configuration, with carburetor settings as-received. This sequence was performed with too high an idle speed, so sequence KES-2 was run with a more suitable idle setting. Following these steady-state documentation runs, the rotary intake valve shown in the right portion of Figure 65 was removed for inspection.

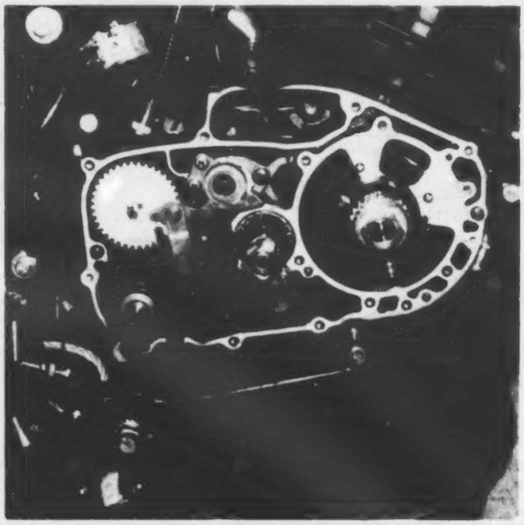


FIGURE 65. ROTARY VALVE IN POSITION ON CRANKSHAFT ON KE-175

From the limited information available to us regarding rotary valve effects on delivery ratios, it was decided that first attempts should be limited to shifting the cut angle of the valve around the crankshaft.(13) Cut angle is the included angle of the disc cutout. Production rotary valve timing is presented in Figure 66. This type of change was expected to shift the maximum delivery ratio up or down the speed range, depending on the direction of shift, thereby possibly changing emissions. The increment of shift most readily available was that of approximately 26°. This being such a coarse change, the effects on emissions were expected to be significant. Sequence KES-3 was conducted after the rotary valve was advanced 26°. This resulted in somewhat lower HC and CO emission rates with slightly more O_2, particularly at idle. Idle quality did not degrade, but WOT (0-100 kph) acceleration time increased to 26.2 sec; and the engine bogged down at the red line of 8000 rpm.

Baseline WOT acceleration time was 16.6 sec, with shifting being done at about 7500 rpm.

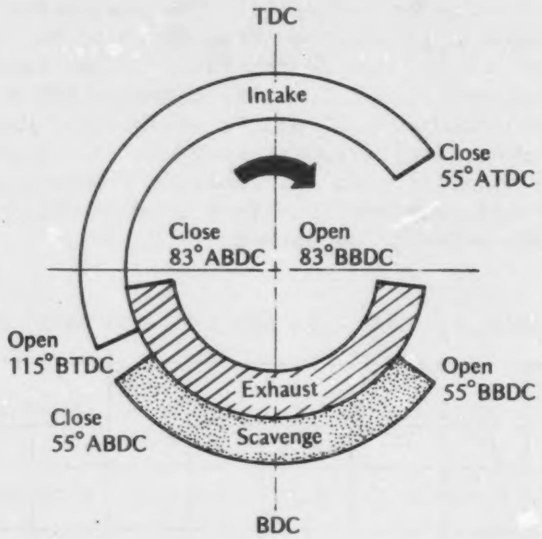


FIGURE 66. PORT TIMING DIAGRAM

The rotary valve was removed and retarded 26° from standard position. Sequence KES-4 was conducted and showed approximately the same emission shifts as KES-3. WOT acceleration time was 21.4 sec, and 9000 rpm was attainable with no evidence of bogging. Evidently, the advance of the cut angle around the crankshaft shifted the optimum delivery ratio down the speed range; while the opposite effect took place when the cut angle was retarded.

A blank rotary valve was fabricated. It was decided that a smaller cut angle would be tried with the cut angle operating in the same portion of crank angle as the original rotary valve. The cut angle was reduced 10° from either side, for a total reduction of 20° cut angle from the original 124° angle.

One FTP and one FET (results presented in Table 34) were conducted using this modified rotary valve. A minor reduction in HC was noted for the FTP, but an opposite effect was observed in the FET results. The emission of CO during FET operation was higher than baseline test results. A more significant change was noted for WOT (0-100 kph) acceleration time, which increased to approximately 27 sec from the baseline test result of 16.6 sec (shifting at 7500 rpm).

From these results, it was decided to return the timing of the intake opening to stock and retain the 10° advance of the intake closing. Another FTP and FET were conducted with this modification. Results from these tests showed the emissions tending to return to those obtained with the stock rotary valve. The WOT acceleration time of 18 sec also approached baseline performance.

Based on the relative ineffectiveness of the aforementioned efforts, it was decided to return to the stock rotary valve and proceed with the second step control measures which consisted of minor carburetor enleanment. Steady-state sequence KES-7 was performed using the stock rotary valve and carburetor setting to provide a midpoint reference. The carburetor was then leaned by changing the jet needle clip position from No. 3 to No. 1 and by adjusting the pilot air screw from one and one fourth turns to two turns out. These settings were selected by road work. Steady-state sequence KES-8 was performed and indicated very good reductions in CO and HC emissions. Two FTPs and two FETs were conducted, and the results appear in Table 34. Significant reduction in both HC and CO were apparent. No driveability problems were encountered, and WOT (0-100 kph) acceleration time remained approximately the same as just before carburetor enleanment was performed (17.0 sec).

TABLE 34. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE KAWASAKI KE-175

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.	7.48	24.16	36.00	0.02	24.2	6.48	34.24	33.46	0.03	21.5
20° mod. to Rotary Valve	6.95	24.32	34.00	0.02	25.1	7.77	42.32	32.53	0.02	18.8
10° mod. to Rotary Valve	7.12	24.53	36.19	0.02	24.3	6.93	37.97	35.49	0.02	19.8
Stock Rotary Valve + Lean Carburetor	4.53 5.00	5.12 5.36	46.78 49.08	0.05 0.05	34.0 32.0	4.35 3.98	12.53 10.85	48.31 48.42	0.10 0.10	28.5 29.8

Following carburetor enleanment, two catalysts in series were welded into the exhaust pipe of the KE-175. The first catalyst was a PTX 314 (2.5 cm "Torvex" and 7.6 cm NGK substrate as discussed for the KH-500), and the second catalyst was a PTX 313 (7.5 cm of NGK substrate as discussed for the RE-5). Provisions were made for air injection in the 7.6 cm (3 in.) space between catalysts. The exhaust muffler was kept intact and mounted at the exit of the second catalyst, as shown in Figure 67. Upon startup, the first catalyst exit temperature rose quickly to over 800°C (the existing 100 percent of full scale point on the temperature recorder). Concerns about possible excessive catalyst temperature were relieved after the temperature monitoring channel was extended to 950°C, and the catalyst temperature was observed to approach 900°C (maximum).

Steady-state sequence KES-9, performed in this configuration, showed very good reductions in HC. Backpressure increases as a result of the two catalysts, however, would not allow speeds over 80 kph (50 mph) at WOT. One FTP conducted in this configuration showed good reduction in HC but a significant increase in CO when compared to tests run with lean carburetion. An FET was not run due to the severe drop in performance noted with the two catalysts in series. The FTP results are presented in Table 35.

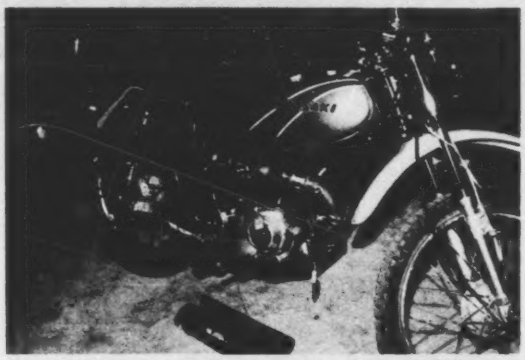


FIGURE 67. TWO CATALYSTS IN
SERIES ON THE KE-175

TABLE 35. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE KAWASAKI KE-175

Test Configuration	FTP Emission Rates, g/km				Fuel Econ.	FET Emission RAtes, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.	7.48	24.16	36.00	0.02	24.2	6.48	34.24	33.46	0.03	21.5
2 Catalysts + Lean - Air	1.10	12.21	57.32	0.02	29.5	backpressure too high				
Mod. Catalyst + Air 0533 + Lean	1.92 1.77	7.89 7.03	61.08 56.17	0.03 0.03	29.6 32.3	2.65 2.78	19.23 20.23	60.56 57.27	0.03 0.02	23.5 23.8
Mod. Catalyst + Air 1033 + Lean	1.66 1.82	6.60 7.15	50.81 59.94	0.04 0.05	35.4 30.6	1.80 2.22	12.52 17.28	53.64 65.00	0.06 0.08	29.5 23.5

Proceeding with the planned control measures, air was injected between the two catalysts. Results from steady-states showed that only small amounts of air were needed and that at 64 kph, air addition yielded no improvement in emissions.

Based on the relative ineffectiveness of air injection and excessive backpressure, the second catalyst was removed from the system. After removal, attempts to check performance were made; but the first catalyst exit temperature exceeded 950°C shortly after catalyst light-off. Excess air for cooling was injected ahead of the catalyst (as shown in Figure 68) but no reduction in first catalyst exit temperature was noted. Using the other extreme, the carburetor was reset to stock (rich) so that less O_2 might reach the catalyst and no air addition was used; but again, no reduction in catalyst exit temperature was noted. The first catalyst was detached from the exhaust assembly, and 3.8 cm (1-1/2 in.) of the 7.6 cm (3 in.) long substrate was removed from it by Engelhard Industries' personnel. The modified catalyst and the second catalyst were installed in their original positions. Steady-state sequence KES-10 was conducted, followed by air injection between the two catalysts. As with sequence KES-9, good reductions in CO and HC were obtained; but backpressure created by the two catalysts in series was too high to allow adequate performance for test purposes. Misfiring became apparent at 32 kph when air was injected.

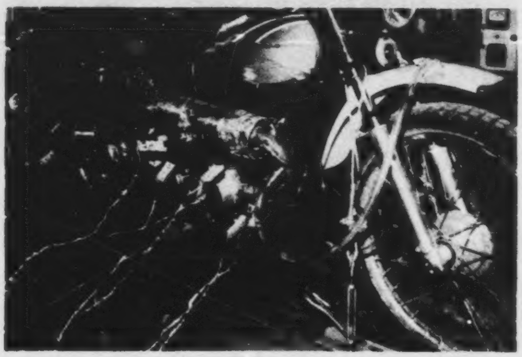


FIGURE 68. KE-175 TEST SET-UP OF AIR INJECTION IN FRONT OF CATALYST

Once again, the second catalyst was removed from the system. Sequence KES-11 was conducted with the modified first catalyst alone. Although performance was improved slightly, maximum speed was limited to approximately 85 kph (53 mph) at WOT. Catalyst exit temperature was reduced to the extent that 900°C was reached with 4.1 m^3/h (2.4 cfm) of air injection at 80 kph (50 mph). Pump No. 0533 driven at 1:1 ratio (pump:crankshaft) was selected based on air injection data recorded on strip charts. Sequence KES-12 was then run to show steady-state emissions coinciding with the various air injection rates (supplied by the pump) ahead of the catalyst. Result from KES-12 indicated significant reductions in HC and CO. It should be noted that the steady-state concentrations were partially diluted as a result of air injection, due to raw emission sampling. As mentioned earlier, maximum speed was adversely affected by the catalyst's higher backpressure. The backpressure changes affected engine breathing, which in turn caused the head temperature to peak during 64 kph operation. Head temperatures were lower at 80 kph due to a rich main jet, as indicated in steady-state results.

Results of two FTPs and two FETs run with the modified catalyst and air injection ahead of the catalyst using pump No. 0533 are given in Table 35. These tests showed good reductions in HC, but an increase in CO caused by incomplete oxidation was noted in comparing these results to tests run with carburetor enleanment alone.

Following these tests, additional air was supplied just behind the catalyst exit in an effort to promote exhaust gas reactions within the hot exit gases from the catalyst. Indications on strip chart data showed that no further reaction took place.

Efforts to lower CO during transient testing were made by installing a larger air injection pump. Pump No. 1033 driven at 1:1 ratio (pump:crankshaft) was used to inject air ahead of the modified catalyst during two FTPs and two FETs. The results of these tests did not repeat very well; although they did indicate that further oxidation of HC and CO was possible with additional air, particularly during the FETs. Sequence KES-13 also indicated the same trends. Figure 69 shows graphically the difference between the injection air rates of the two air pumps used in conjunction with the modified catalyst.

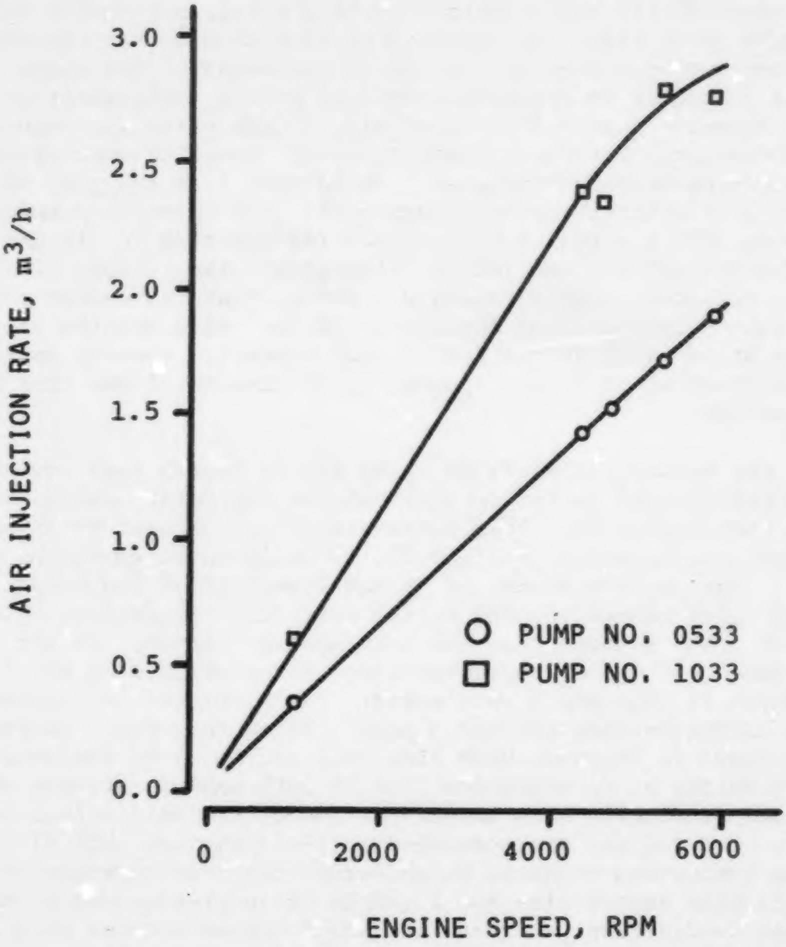


FIGURE 69. AIR INJECTION INTO KE-175 VIA PUMP NO. 0533 AND PUMP NO. 1033

Realizing that the bulk of 2-stroke HC emission results from overscavenged or "short-circuited" fuel-air mixture, an experiment was devised to determine whether or not this "slug" of hydrocarbons could be selectively removed from the exhaust. In preparation for this experiment, the KE-175's exhaust system was returned to stock and the exhaust port was tapped to provide an extraction point. In addition, the carburetor was left lean, which significantly reduces the CO emission but has relatively minor effect on the HC emission, which is largely due to the overscavenged fuel-air mixture. Figures 70 through 74 illustrate the test set-up used in this experiment. If the untrapped fuel-air mixture could be captured from the exhaust stream, it was reasoned the mixture might then (theoretically) be added back to the crankcase fuel-air charge and burned. Success of such a total system would result in eliminating the bulk of the unburned hydrocarbons in the exhaust and in improving the fuel efficiency of the 2-stroke engine.

The experimental set-up consisted of a rotary extraction valve with an 85° cut angle and a valve port opening of 23.4 mm diameter (giving an angle area of 366° cm^2) was operated by the engine crankshaft. The inlet side of this valve was connected to the engine exhaust port by approximately 20 cm of 1.9 cm inside diameter pipe. The outlet side of the valve was connected to a rotary vane vacuum pump through a surge chamber. Surge chamber pressure was measured by a U-tube mercury manometer. Extraction flow and pump in-leakage were monitored by a rotameter at the pump exit. Raw emission samples were taken downstream of the normal tailpipe exit (sample line No. 1) and between the engine exhaust port and the rotary extraction valve (sample line No. 2). Initial rotary extraction valve timing was set so that the center of the disc valve's cut angle passed through the center of the valve opening as the engine crankshaft was at 34° ABDC (After Bottom Dead Center). Various extraction flowrates were tried at different speeds, while line No. 1 and line No. 2 were sampled alternately.

With the motorcycle operated at 48 kph in fourth gear and an initial vacuum of 8.4 kPa applied to the exhaust side of the rotary valve, some "rich" mixture gases were extracted. This extraction was indicated by an increase in HC and oxygen concentration in line No. 2, while these emissions decreased in line No. 1. Varying the amount of vacuum (measured at the surge chamber) applied to the valve caused changes in the extraction flowrates, which changed the quantity of gases removed from the main exhaust stream. As the extraction flow was increased, HC and O_2 concentrations increased in line No. 2 while further decreases in line No. 1 were noted. These changes progressed until line No. 2 HC concentrations reached a peak. After this peak, increased extraction flow began to decrease both line No.1 and No. 2 HC concentrations. The decreasing shifts of HC concentrations in both exhaust streams were caused by the continued extraction of a larger portion of the main stream exhaust which not only included the overscavenged fuel-air mixture, but also a larger portion of the combustion products which border the overscavenged mixture. This over-extraction caused line No. 2 sample concentrations of HC and oxygen to decrease due to dilution, whereas line No. 1 concentrations were reduced because more of the fuel-air mixture and combustion products were being extracted.

The optimum extraction flowrate for the KE-175 operating at 48 kph (30 mph) in fourth gear, at 4300 rpm, was approximately 3.9 m^3/h (2.3 cfm). At this flowrate, HC and oxygen concentrations were maximized in line No. 2,

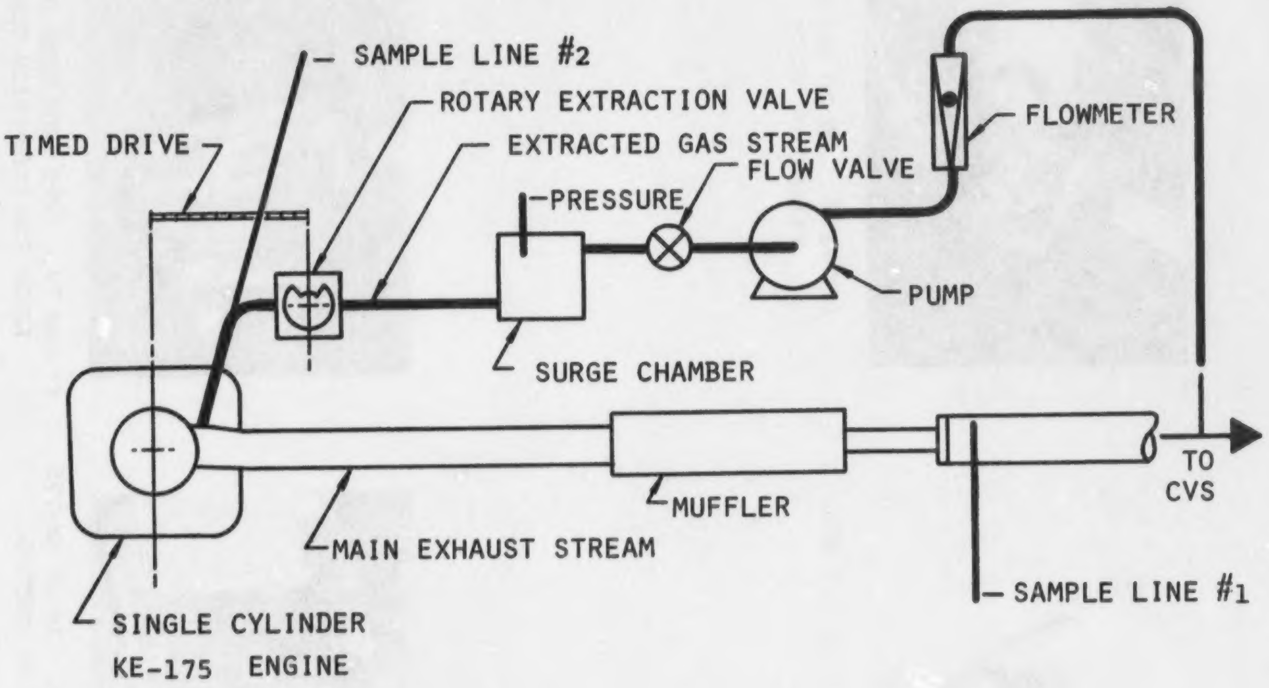

SAMPLE LINE #2
ROTARY EXTRACTION VALVE
TIMED DRIVE
EXTRACTED GAS STREAM
FLOW VALVE
PRESSURE
FLOWMETER
PUMP
SURGE CHAMBER
TO CVS
MUFFLER
MAIN EXHAUST STREAM
SAMPLE LINE #1
SINGLE CYLINDER
KE-175 ENGINE

FIGURE 70. SCHEMATIC OF 2-STROKE OVERSCAVENGED GAS EXTRACTION EXPERIMENT

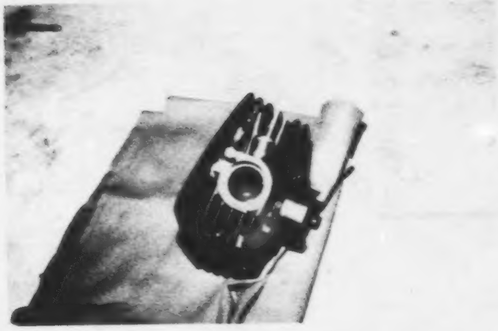


FIGURE 71. MODIFIED KE-175 HEAD

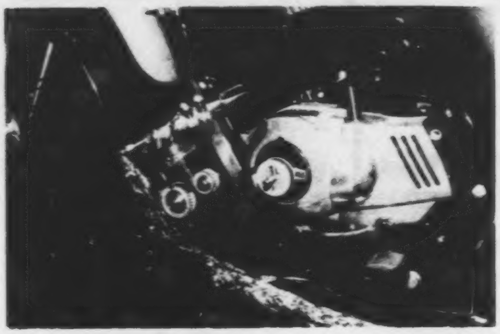


FIGURE 72. TIMED DRIVE AND EXTRACTION VALVE

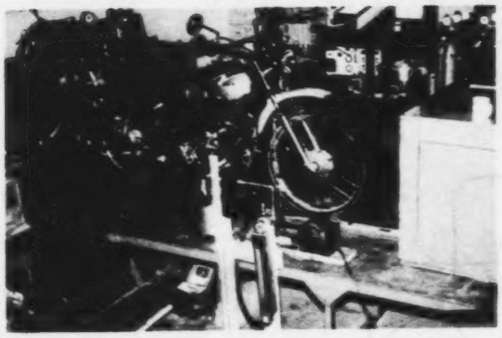


FIGURE 73. RIGHT SIDE VIEW OF KE-175 READY FOR EXTRACTION TESTING

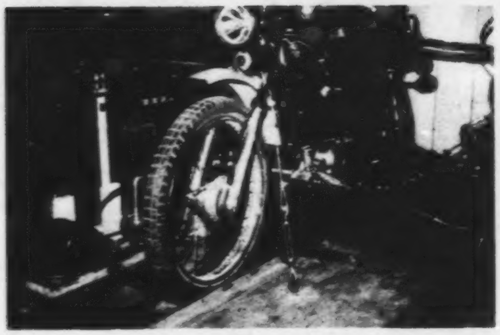


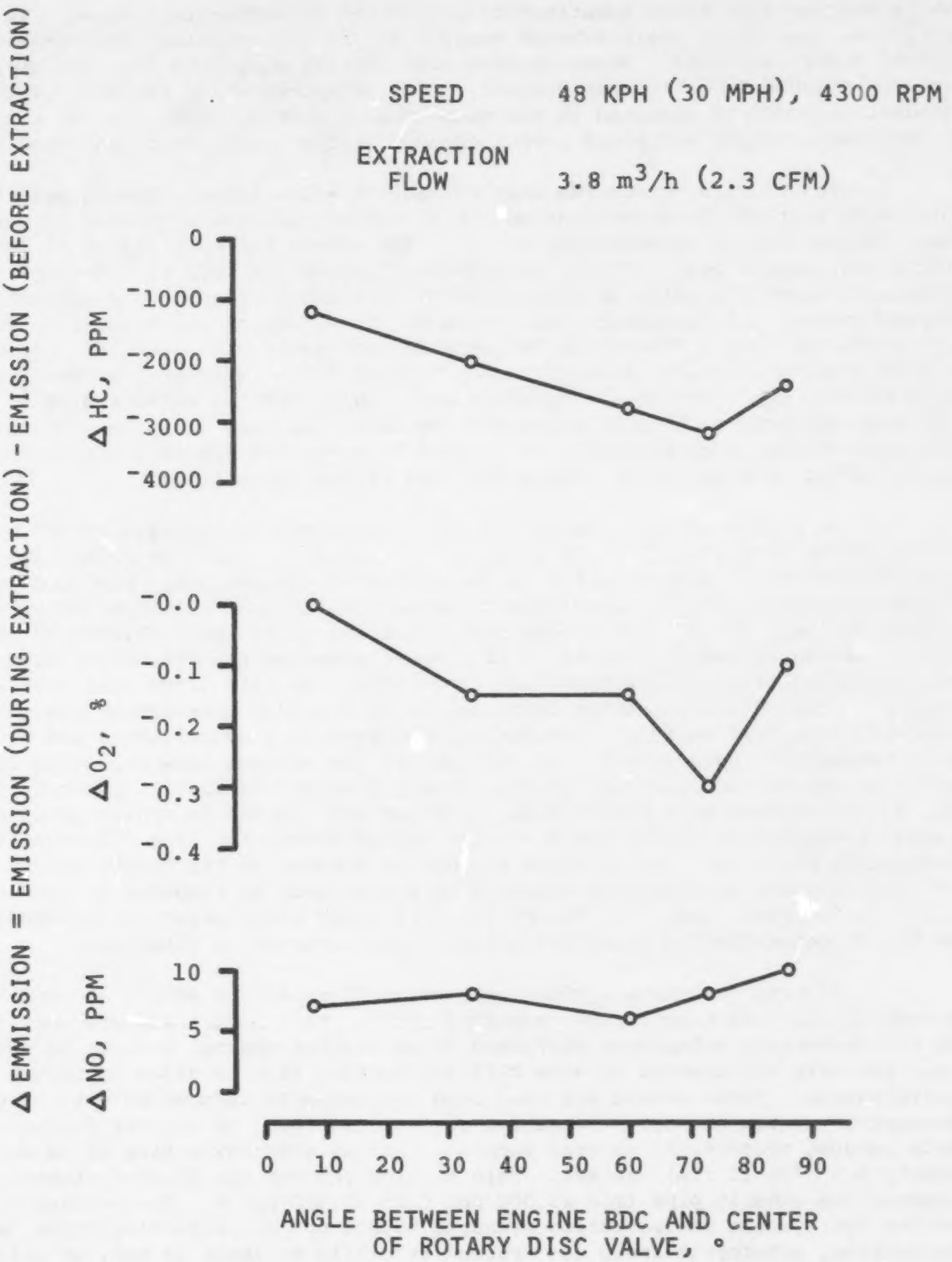
FIGURE 74. LEFT SIDE VIEW OF KE-175 READY FOR EXTRACTION TESTING

while decreases in these constituents were noted in sample line No. 1. In addition, line No. 1 (main exhaust stream) NO and CO_2 emission concentration showed minor increases. These concentration shifts suggested that the over-scavenged exhaust portion was actually being extracted while the bulk of the combustion products remained in the main exhaust stream. Little or no change in CO concentration was noted (stock exhaust system - carburetor adjusted lean).

In order to select the best extraction valve timing, timing shifts were made so that the concentrations of HC and oxygen were minimized in the main exhaust stream (sample line No. 1). The engine was operated at 48 kph (4300 rpm, fourth gear) and the extraction flowrate was held at 3.9 m^3/h. Figure 75 shows the relative changes in HC, O_2, and NO for various extraction valve timings. As indicated, the timing of the center of the extraction valve operation was varied from 8° to 86° ABDC in increments of 13° to 26°. Some timing conditions caused a small vacuum (1 kPa) to be registered at the surge chamber with the flow valve completely off. An extraction valve timing of 73° ABDC appeared to be best because it produced the most useful effect on the main exhaust stream emissions. Figure 76 shows the 73° ABDC extraction valve timing in relation to engine port and intake valve timing.

As mentioned previously, extraction flowrates at various speeds were important because they directly affected the amount of gases extracted from the main exhaust stream relative to the amount of exhaust gases produced. A number of extraction flowrates were tried at various speeds, while the valve timing was held at 73° ABDC (shown most effective at 48 kph). Figure 77 shows the variation in sample line No. 2 HC concentration as the extraction flow was varied during steady-state operating conditions. At idle (1500 rpm), the extraction line HC concentration increased until 2.6 m^3/h extraction flow was reached, then fell rapidly. Checking the exhaust pipe constituents and tail pipe temperature data showed that too much of the exhaust flow was being removed by extraction flowrates greater than 2.6 m^3/h. Similarly, peaks in line No. 2 hydrocarbons were observed at 32 and 48 kph (20 and 30 mph). After these peaks, increases in extraction flowrates caused extraction line dilution by combustion products. The dilution was not as evident at the higher speeds as at idle, because more exhaust products were generated as compared to the extraction flowrates used. At 64 kph (40 mph), only minor dilution occurred; so the HC concentration peaked at a much higher extraction flowrate.

Efforts to obtain optimum extraction flowrates at 80 kph (50 mph) resulted in the head temperature exceeding 250°C. This result was probably due to the carburetor enleanment performed as an earlier control measure in conjunction with the removal of some cylinder cooling fins to allow for system installation. These causes may have been coupled with unknown effects of the extraction system on engine breathing characteristics. In shorter tests, main exhaust concentrations were sampled, then an extraction flow of approximately 8.5 m^3/h (5 cfm) was set. This setting reduced the HC concentration, leaving the exhaust pipe from 23,000 ppm C to 16,000 ppm C. The extraction system hydrocarbon concentration measured 55,200 ppm C. Following rapid data collection, motorcycle speed was reduced gradually to about 25 kph, at which point the engine died and locked up as a result of the high operating temperature reached. After sufficient engine cool-down, the engine was restarted. No operational problems were encountered, so further testing was conducted at more moderate speeds.



SPEED 48 KPH (30 MPH), 4300 RPM

EXTRACTION FLOW 3.8 m^3/h (2.3 CFM)

FIGURE 75. CHANGES IN MAIN EXHAUST STREAM EMISSIONS AS ROTARY EXTRACTION VALVE TIMING VARIED

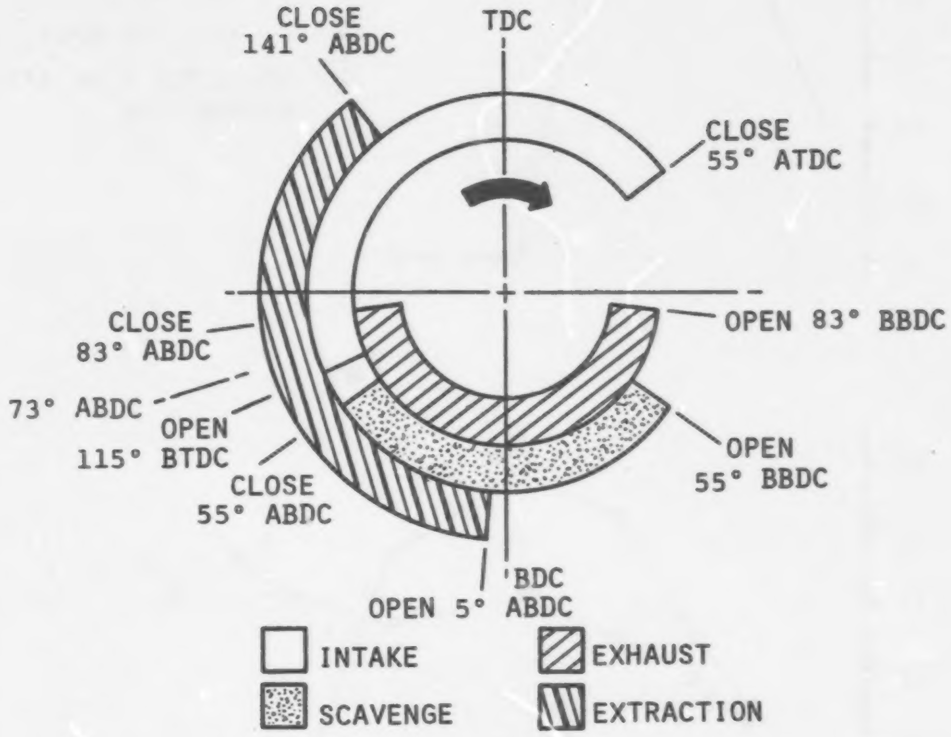

CLOSE
141° ABDC
TDC
CLOSE
55° ATDC
CLOSE
83° ABDC
OPEN 83° BBDC
73° ABDC
OPEN
115° BTDC
OPEN
55° BBDC
CLOSE
55° ABDC
BDC
OPEN 5° ABDC
INTAKE
EXHAUST
SCAVENGE
EXTRACTION

FIGURE 76. PORT TIMING DIAGRAM OF KE-175, 2-STROKE

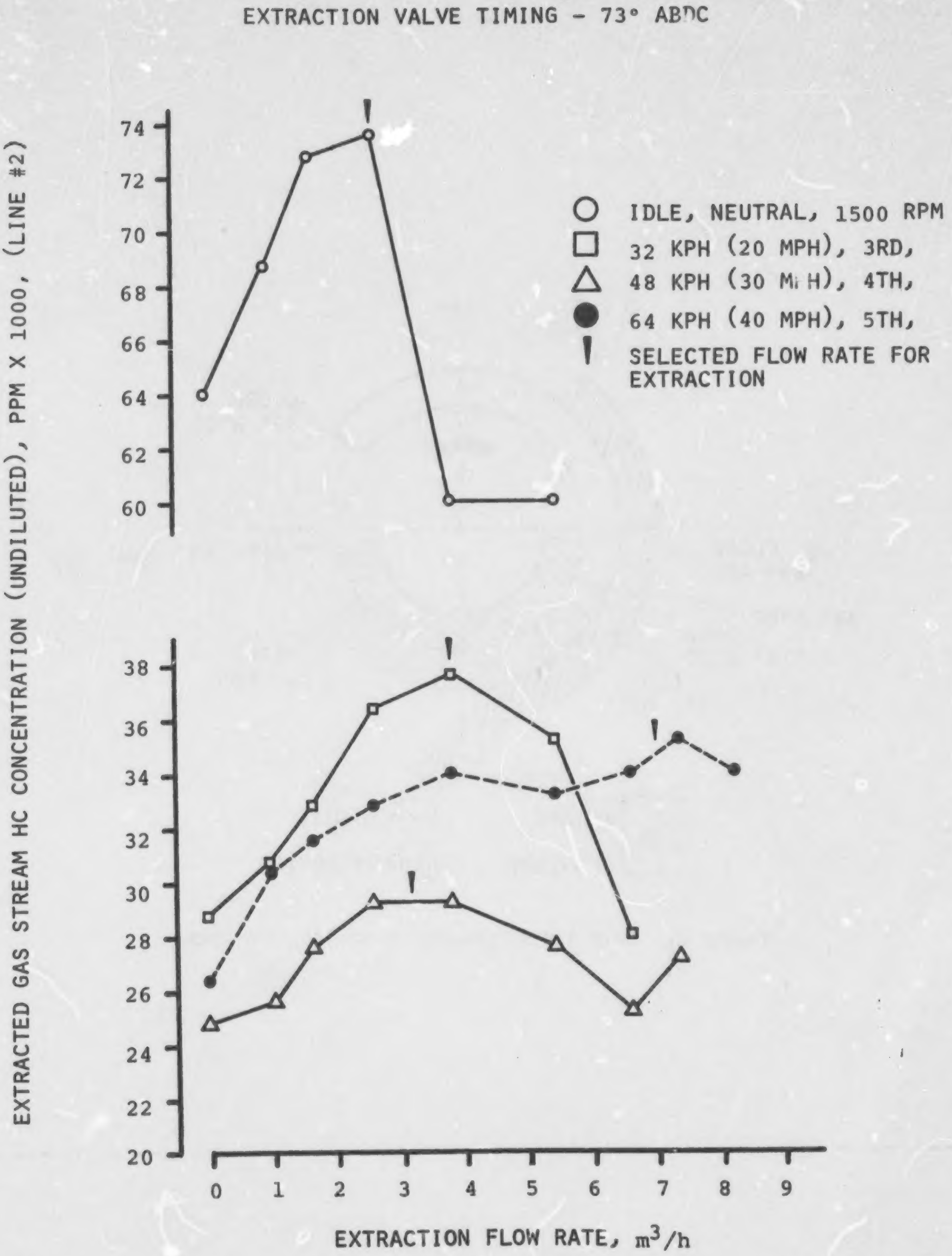


FIGURE 77. VARIATION OF HC CONCENTRATION WITH VARIOUS EXTRACTION FLOWRATE

The results of steady-state operation conducted with and without the extraction system active are given in Table 36. The extraction valve timing was 73° ABDC, and the extraction flows used at the various speeds were those selected from data given in Figure 77. In all cases, the HC concentrations in the normal exhaust stream were reduced significantly. At all speeds except idle, shifts in emission concentrations indicated that the overscavenged fuel-air mixture was being selectively removed from the exhaust stream (extraction flow at idle was probably somewhat excessive). Overscavenged gas capturing was most evident at the higher speeds (64 and 80 kph).

It was not within the scope of this project to refine the extraction selectivity beyond the point of this introductory experiment. The results did verify the reduction of the exhaust hydrocarbons by selectively removing the unburned fuel-air mixture using a timed extraction device. It is expected that further refinements of the basic system could lead to greater reductions of exhaust hydrocarbons and that the system could be incorporated integrally into a 2-stroke engine by proprietary efforts.

9. Suzuki TS-100

Based on results from rotary valve modifications on the KE-175, cut angle shifts around the crankshaft were not used as an emission control measure on the TS-100. Prior to any rotary valve modification, another "baseline return" test sequence was performed (after idle speed and pilot air screw adjustments were made to reduce excessive idle speed and to lower CO emissions). Rotary valve modifications were initiated by reducing the cut angle by 10° from both ends, thus reducing the cut angle by 20° total. Steady-state sequence TSS-2 showed minor decreases in HC and CO at lower engine speeds; but at higher engine speeds, these emissions increased slightly. WOT (0-80 kph) acceleration time increased from 20.6 sec (second baseline) to 24.5 sec. As with steady-state results, FTP and FET results showed increases in HC and CO, with a decrease in fuel economy.

For the next sequence, the 10° retardation of intake opening was removed; while the 10° advance of the intake closing was retained (same as with the KE-175). Steady-state sequence TSS-3 was followed by an FTP and an FET on the TS-100. Emission rates of HC and CO decreased further than with the first modification. WOT acceleration time was also improved over the previous modification to 23.8 sec. Although steady-state results were promising, the FTP and FET results showed a worsening effect. FTP and FET results for these rotary valve modifications are presented in Table 37. Copies of computer printouts are presented in Appendix D along with steady-state sequence data.

After control measures utilizing rotary valve modification were determined to be ineffective, the stock rotary valve was reinstalled, the carburetor was set lean, and the Syncro CDI system (developed for snowmobiles) was installed. Enleanment was achieved by changing the jet needle clip position from No. 3 to No. 1 and by adjusting the pilot air screw to two and one fourth turns out. No problems were encountered during installation of the CDI system, although timing adjustment by changing point gap was necessary. Steady-state sequence TSS-4 was conducted prior to two FTPs and two FETs. Both steady-state and transient test data showed good reduction in CO and HC. It should be noted that the average maximum speed attained during FET operation was only 64 kph

TABLE 36. STEADY-STATE EMISSION CONCENTRATIONS FROM THE KAWASAKI KE-175 DURING OVERSCAVENGED GAS EXTRACTION

Conditions			Concentrations (Undiluted)				
Operating Condition	Surge Chamber Pressure, kPa	Sample Line, Extraction Flow, m^3/h	CO %	CO_2 %	O_2 %	NO ppm	FID HC ppm C
Idle	0.7	Line #1, 0	1.30	6.67	10.8	6.1	59,200
Neutral	-0.3	Line #1, 2.5	1.18	4.56	13.6	5.9	36,000
1500 rpm	-0.3	Line #2, 2.5	1.85	7.74	8.8	6.1	68,400
32 kph	1.0	Line #1, 0	1.00	10.44	6.4	20.	32,000
3rd gear	-2.4	Line #1, 3.9	1.43	10.44	6.0	24.	23,600
3700 rpm	-2.4	Line #2, 3.9	1.62	10.44	5.9	14.	36,400
48 kph	-0.9	Line #1, 0	2.23	11.67	4.6	31.	20,400
4th gear	-5.1	Line #1, 3.2	1.88	11.67	4.5	32.	16,800
4300 rpm	-5.1	Line #2, 3.2	1.98	11.10	5.1	17.	31,600
64 kph	3.0	Line #1, 0	0.18	12.38	5.0	230.	19,200
5th gear	-12.8	Line #1, 6.7	0.18	13.24	3.8	300.	10,400
4700 rpm	-12.8	Line #2 6.7	0.18	10.88	6.8	200.	35,600
80 kph	5.1	Line #1, 0	3.00	10.77	3.5	460.	23,600
5th gear	-11.5	Line #1, 8.3	3.34	11.56	2.1	450.	16,000
5900 rpm	-11.5	Line #2, 8.3	2.52	7.92	7.1	220.	55,200

(40 mph), based on a head temperature limitation of 250°C. Fuel economy increased as expected, and WOT acceleration time decreased slightly from 20.6 to 19.9 sec. Results of the transient tests are given in Table 37.

TABLE 37. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE SUZUKI TS-100

Test Configuration	FTP Emission Rates, g/km				Fuel Econ. km/ℓ	FET Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
2nd Baseline	4.23	8.09	34.63	0.02	38.8	5.52	16.85	35.62	0.07	29.3
20° Valve Red.	4.45	8.94	37.29	0.02	36.0	7.01	27.00	32.79	0.04	23.9
10° Valve Red.	4.53	8.47	36.67	0.02	36.6	7.42	27.82	34.94	0.05	22.8
Stock Valve + Lean Carb. + CDI	4.80	1.69	43.10	0.07	38.5	3.47	1.31	42.41	0.14	42.0
	4.61	1.72	42.57	0.07	39.2	3.71	0.89	43.93	0.19	40.8
S. V. + Lean + CDI + Mod. Cat. + Air	1.13	1.22	60.42	0.10	35.6	1.73	16.59	47.37	0.05	29.5[a]
	1.25	0.64	60.73	0.10	35.7	1.61	16.37	48.92	0.05	29.2[a]

[a] Maximum WOT speed - 79 kph

At the suggestion of the Project Officer, a catalyst was installed for use with air injection on the TS-100. This additional control measure utilized an Engelhard PTX 314 catalyst, which consisted of 2.5 cm of "Torvex" followed by 7.6 cm of NGK substrate (as described further in KH-500 discussion). Figure 78 shows the catalyst welded into position. Initial steady-state testing conducted to size the air pump requirement showed that performance had deteriorated appreciably as a result of catalyst-caused backpressure increase. Maximum speed attainable at WOT operation was 66 kph (41 mph), and head temperature peaked at 64 kph (40 mph) as a result of impaired engine breathing. Due to the severe performance degradation, no transient cycle tests were run.

In order to attempt emission reduction with a catalyst, the modified catalyst used on the KE-175 was substituted. As mentioned in the KE-175 discussion, this catalyst consisted of 2.5 cm "Torvex" followed by 3.8 cm of NGK substrate. Following this catalyst substitution, the maximum speed increased to 79 kph (49 mph) at WOT. Air pump No. 1033, driven at 1:1, was selected based on limited steady-state data. High head temperatures at 64 kph did not allow variation in air injection at that speed. Data from lower speeds showed improved catalyst activity with air addition, so the pump was sized using those data. Steady-state sequence TSS-5 and two FTPs and FETs were run with the modified catalyst, air injection by pump No. 1033, and the carburetion adjusted lean as described earlier. Results of the FTP tests showed lower HC and CO, while the FET results showed a reduction of HC and an increase in CO, indicating that even more air was needed. A decrease in the emission of NO_x during the FET also verifies that a reducing atmosphere was present. WOT (0-80 kph) accelerations could not be completed due to catalyst backpressure and consequent reduced maximum speed, but 0-70 kph averaged 22 sec. Transient test results are given in Table 37. These tests concluded emission control measures to be applied to the TS-100.

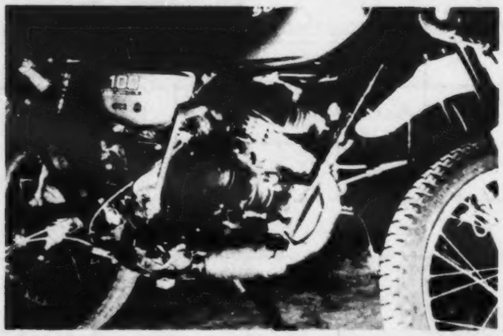


FIGURE 78. CATALYST WELDED
INTO EXHAUST OF TS-100

10. Suzuki GT-750

First step control measures planned for the GT-750 were the addition of CDI and minor carburetor enleanment. Efforts to find a CDI system for this 3-cylinder, 2-stroke machine revealed that no suitable production system was available. After contacting SK Systems, it was decided to combine a 2-point CDI system with a single-point system to achieve the CDI system requirement. A single 3-point unit for a 3-cylinder machine was being developed, but it could not be released until further testing was completed. The two units were received and installed on the GT-750.

The "borderline limit" of carburetor adjustment was determined by comparative road performance checks following step changes in adjustment. The jet needle clip was moved from the fourth (as-received) to the second position. The fuel-air adjustment screws were turned in from one turn out to one half turn out. Vacuum alignment was maintained. Driveability was rated as acceptable, so further attempts to lean the carburetors were made. The clip was moved to the top clip position (leanest selection available); but road performance degraded noticeably, so the clip was returned to position No. 2.

Results of two FTPs and two FETs run in this configuration are given in Table 38. Significant reductions in CO were noted for both FTP and FET cycles. Emission of HC showed only a minor decrease during FTP operation, but a pronounced decrease was noted during FET operation. These same trends were evident in steady-state comparison between sequence GTS-1 (baseline) and GTS-2 (present configuration), particularly at idle and during high speed operation. Acceleration performance (0-100 kph) improved slightly from 6.4 to 6.3 sec as a result of leaner (than stock) carburetion. Driveability evaluations showed no degradation in performance; in fact, "bucking" was reduced and some gain in throttle response was noted. "Bucking", as mentioned here, was used to describe a lurching action that was evident during steady-state operation at intermediate speeds, both on the road and on the dynamometer.

TABLE 38. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE SUZUKI GT-750

Test Configuration	Emission Rates, g/km				Fuel Econ. km/ℓ	Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.	14.12	12.07	72.37	0.03	17.3	8.07	8.93	67.00	0.04	22.0
CDI + Lean Carburetion	12.24	5.16	75.98	0.04	19.1	3.98	1.19	65.17	0.07	29.2
	13.26	5.60	77.64	0.04	18.3	4.81	1.03	75.26	0.12	25.3

The second step of emission control was spark-ignited after burning. This control technique, based on Suzuki's EPIC system (Exhaust Port Ignition Cleaner), utilized timed spark ignition within approximately 1 cm of the exhaust port opening to ignite the overscavenged raw mixture typical of 2-stroke operation. In order to apply this technique to the GT-750, the head and cylinder assemblies were removed to facilitate machining of spark plug mounting holes. Inspection of the water-cooled cylinder assembly showed that the available locations for the spark plugs were limited. The closest position available without piercing the water jacket was an average of 5 cm downstream of the exhaust port plane. The timed spark ignition was to be initiated via a Boyer pointless electronic ignition system designed for use on 3-cylinder, 4-stroke machines.

After receiving the ignition system, it was discovered that the wiring diagram showed that all three afterburner spark plugs would fire three times per revolution. This situation would cause each plug to fire at the desired 70° BTDC, then at 50° ATDC (which might be tolerated), and again (with both ports open) at approximately "Bottom Dead Center" which was unacceptable. Inspection of the wiring diagram did not reveal any sure method for modifying the circuit to fire the three plugs independently. Consequently, duplicate stock ignition parts were ordered immediately.

Figure 79 shows the duplicate ignition system and one of three spark plugs mounted downstream of the exhaust port. A switch was incorporated into the system so that the afterburner spark could be turned on or off as needed. Timing variations from 85° to 25° BTDC were tried with no success. It was felt that the spark plugs were not close enough to the port opening to "catch" the overscavenged gases. Long spark igniters were made, such that a 9.5 mm (3/8 in.) diameter stainless tube served as ground electrode, a glass sleeve as the insulator, and a 1.6 mm (1/16 in.) diameter stainless rod as the positive electrode. Good spark was observed across approximately a 3.2 mm (1/8 in.) gap in ambient air. This 25 cm (10 in.) long igniter was positioned approximately 6 mm (1/4 in.) from the port opening, but no reaction was noted with timing at approximately 50° and 10° BTDC. Various other spark locations were tried, but none seemed to work until the choke was used. With the choke on, afterburning ignition took place approximately 8.9 cm (3-1/2 in.) downstream of the port at several different timing settings. Figures 80 and 81 illustrate the long spark igniter and its application.

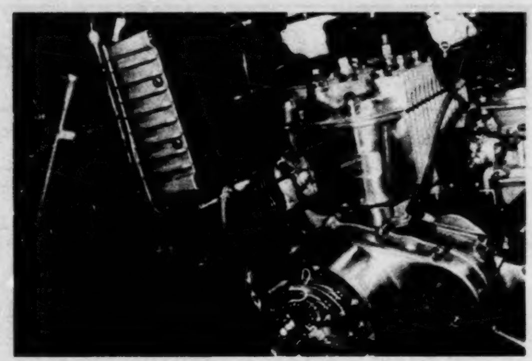


FIGURE 79. SPARK-IGNITED AFTERBURNER INSTALLED ON GT-750

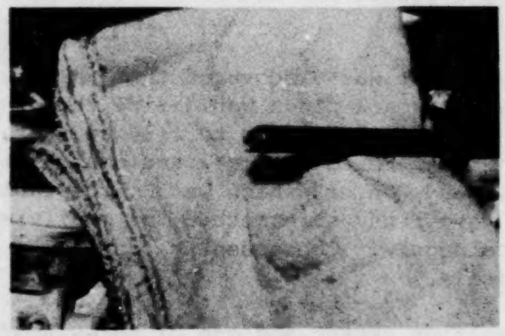


FIGURE 80. LONG SPARK IGNITER

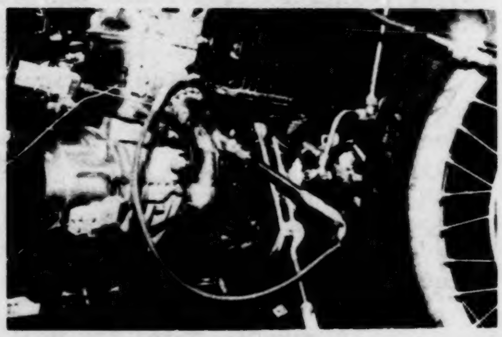


FIGURE 81. LONG SPARK IGNITER USED ON GT-750

These preliminary trials were followed by more systematic variation of parameters such as afterburner spark timings, distance of spark from exhaust port, engine speed and load. The exhaust port was fully closed at 97° BTDC, so it was reasoned that the afterburner system should fire very close to this timing in order to catch the overscavenged gases. Timing of the system was varied from 95° to 40° BTDC with the spark tip moved from 6 to 25 mm downstream of the exhaust port at engine speeds corresponding to idle (1250 rpm); 64 kph, fourth gear; 97 kph, fourth gear; and 97 kph, fifth gear. No exhaust ignitions were observed from either temperature or emission data.

As mentioned earlier, it was reasoned that the overscavenged fuel-air mixture should be located very close to the piston wall shortly after exhaust port closure. Based on experimental work conducted on a single cylinder 2-stroke engine, the rich mixture was reported to pass through a point 10.5 cm downstream of the cylinder wall when the crankshaft angle was between 50° to 30° BBDC (Before Bottom Dead Center). Intermittent exhaust ignitions were initiated by spark discharge at this location.(14) There was concern that if this timing and spark position were used on the GT-750, an exhaust-ignited flame front could propagate upstream through the exhaust and transfer ports (both open) and possibly into the crankcase. This possibility of improper operation or explosion hazard deterred us from attempting to use the referenced timing. Due to the reported exhaust ignition point's being located at a relatively large distance from the exhaust port opening, it was considered that we could approach this condition by firing the afterburner system earlier and closer to the port than referenced. This "earlier" combination, it was reasoned, should allow exhaust ignitions while the GT-750's exhaust port was closed. The afterburner system was fired at 50° ATDC with the igniter tip varied from 1.3 to 12.7 cm downstream of the exhaust port opening, but no reaction was noted at any speed. Finally, the system was timed to fire at 75° ATDC with the ignition position varied as before. Again, no exhaust ignitions were indicated by either emissions monitoring or temperature data. No further testing was conducted with the afterburner system alone.

Emissions reduction by exhaust air injection was tried next. Compressed air was injected into the exhaust system through sparger tubes as done with other motorcycles. No reactions were observed during steady-state operation. The afterburner system was also used in conjunction with air injection, but no charge ignition occurred.

Three Engelhard PTX 314 2-stroke catalysts with "Torvex" foresections were welded into the exhaust pipes as shown in Figure 82. Steady-state sequence GTS-3 was run without air addition. An FTP and an FET were also performed without air addition, showing significant reduction in HC and smaller reduction in CO. Evidently, enough oxygen was delivered to the catalyst as a result of carburetor enleanment to allow good oxidation of hydrocarbons. The hydrocarbon reductions were achieved without increasing CO, which was observed for other 2-stroke motorcycles run with catalyst and no additional air.

Steady-states with variation in air injection were performed, and air pump No. 1533 driven at 1.87:1 (pump:crankshaft) ratio was chosen for air injection with catalysts. Following air pump installation as shown in Figure 83, results from steady-state sequence GTS-4 and two FTPs and FETs showed further reductions in HC and CO emissions. Sequence GTS-4 showed that the greatest reduction in HC and CO (comparing to GTS-3) occurred in the 32 kph (20 mph) to 64 kph (40 mph) range. Transient test results, given in Table 39, reflected this same trend, as evidenced by a larger percentage change in HC and CO for FTP results than for FET results. WOT (0-100 kph) acceleration increased from 6.4 to 8.6 sec as a result of backpressure increase due to catalyst addition. No severe performance degradation was noted during road evaluations. Surprisingly, an increase in fuel economy was noted for FTP operation. This was probably the result of backpressure influence on acoustics, which may have decreased the amount of overscavenging, thereby increasing engine efficiency for mid-range operation. These tests concluded the application of control measures to be applied to the GT-750.

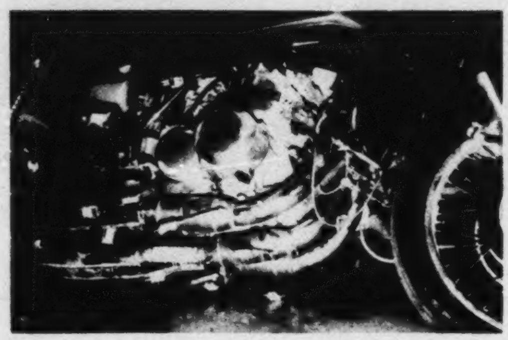


FIGURE 82. CATALYSTS INSTALLATION ON GT-750

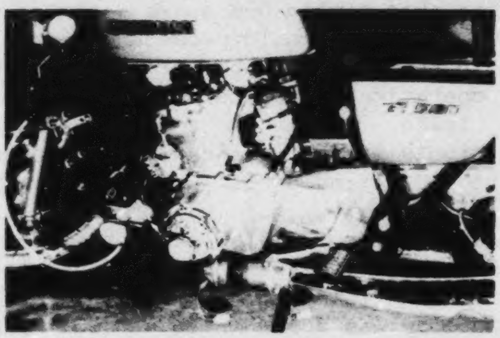


FIGURE 83. AIR PUMP (No. 1533) INSTALLATION ON GT-750

TABLE 39. EMISSION RESULTS FROM FTPs AND FETs PERFORMED ON THE SUZUKI GT-750

Test Configuration	Emission Rates, g/km				Fuel Econ. km/ℓ	Emission Rates, g/km				Fuel Econ. km/ℓ
	HC	CO	CO_2	NO_x		HC	CO	CO_2	NO_x	
Baseline Avg.	14.12	12.07	72.37	0.03	17.3	8.07	8.93	67.00	0.04	22.0
Catalysts + Lean + CDI	1.85	4.43	113.43	0.05	18.6	0.84	0.59	96.58	0.12	23.3
Catalysts + Lean + CDI + Air	1.47	0.77	110.55	0.05	20.1	0.60	0.19	91.19	0.07	24.9
	1.37	0.72	107.91	0.06	20.7	0.53	0.17	91.98	0.10	24.8

VI. MALADJUSTMENT PHASE

This section pertains to an "Engine Maladjustment" phase, which was requested by the Project Officer in order to gather information on changes in emissions resulting from adjustments other than stock settings suggested by the manufacturer. The four motorcycles selected for this phase were the Suzuki TS-100, Honda XL-125, Yamaha RD-400, and the Kawasaki KZ-900. The three maladjustment categories of interest were: carburetor adjusted "rich", carburetor adjusted "lean", and timing advanced beyond manufacturer's suggested setting. Each of these categories was treated independently for each of the four motorcycles selected. Recommended idle speeds were maintained by idle speed adjustment for each category.

Definitions of maladjustments were as follows:

Rich - lower clip one position below standard on main metering rod, and turn idle air screw rich (in) one half turn from recommended.

Lean - raise clip one position above standard on main metering rod, and turn idle air screw lean (out) one half turn from recommended.

Advanced Spark - varied among motorcycles; advanced 5° from standard for Suzuki TS-100, 10° from standard for Honda XL-125, 7° Kawasaki KZ-900, and 0.5 mm from standard for Yamaha RD-400C.

It should also be noted that baseline runs were made with ignition timing as set by dealers on some machines. Timing on the Suzuki TS-100 during baseline was retarded 3° from standard, while that on the Yamaha RD-400C was retarded 0.5 mm from standard.

Results of emissions tests performed to evaluate the effects of carburetor and ignition maladjustments are summarized in Table 40, with baseline and zero-kilometer results included for comparison. Steady-state data used to decide whether or not specific maladjustments caused measurable changes in emissions are given in Appendix E, along with reduced copies of computer printout from transient test summarized in Table 40.

Referring to Table 40, most of the maladjustments produced changes in emissions which were in the expected directions. In other words, FTP emissions of HC and CO were uniformly greater for the rich condition and uniformly lower for the lean condition. The reverse trend occurred uniformly for CO_2 and fuel economy and in three out of four cases for NO_x. The effects of advanced spark timing were much more mixed than those for mixture changes during FTP tests.

Effects of mixture maladjustments on FET emissions and fuel economy were generally non-uniform for the 2-stroke bikes, but followed expected patterns for the 4-stroke machines. The small Suzuki TS-100, in particular, yielded apparently erratic results. It is surmised that at least some of the odd values for the TS-100 resulted from greater use of near-WOT conditions when the carburetor was lean, leading to poor scavenging or carburetor operation in the high speed enrichment phase. FET with advanced timing on the TS-100

TABLE 40. SUMMARY OF MALADJUSTMENT EMISSION TEST RESULTS

Motorcycle	Actual displ., cm^3	1978 HC std. g/km	Run	FTP emissions g/km				FTP fuel km/l	FET emissions g/km				FET fuel km/l
				HC	CO	CO$_2$	NO$_x$		HC	CO	CO$_2$	NO$_x$	
Suzuki TS-100	98	5.0	Zero[a]	5.44	11.27	33.91	0.02	34.3					
1 cyl. 2-s			Baseline[a,b]	7.09	13.19	37.76	0.03	29.2	7.44	24.21	36.83	0.04	23.6
			Lean[b]	6.01	3.46	41.07	0.06	35.8	10.29	22.03	41.86	0.07	21.3
			Rich[b]	9.11	25.13	27.09	0.02	24.8	11.50	28.64	32.10	0.03	20.5
			Advanced[c]	4.20	17.31	30.67	0.02	33.2	5.35	21.61	34.21	0.05	27.4
Yamaha RD400	398	8.5	Zero[a]	12.21	10.41	62.27	0.02	20.1					
2 cyl. 2-s			Baseline[a]	10.32	12.62	58.23	0.03	21.3	4.79	10.72	54.64	0.04	26.9
			Lean	8.74	4.01	67.30	0.02	23.2	5.12	2.15	66.27	0.06	27.1
			Rich	14.05	28.74	47.24	0.02	17.2	7.94	32.16	46.23	0.02	19.1
			Advanced	8.76	9.48	56.44	0.02	23.7	4.51	8.21	55.09	0.04	28.3
Honda XL-125	124	5.0	Zero[a,d]	0.66	11.74	37.97	0.12	40.5	0.30	11.23	31.19	0.11	46.9
1 cyl. 4-s			Baseline[a]	0.78	11.61	35.15	0.13	42.3	0.46	8.15	48.10	0.95	37.4
			Lean	0.53	6.74	42.97	0.30	42.6	0.38	4.89	45.04	0.92	43.2
			Rich	3.45	16.15	25.04	0.05	38.6	0.59	13.29	41.77	0.60	36.1
			Advanced[c]	0.95	17.61	32.30	0.13	37.6	0.49	11.49	47.63	0.83	34.6
Kawasaki KZ900	903	14.	Zero[a]	2.36	31.79	88.28	0.18	16.2	0.81	22.36	69.79	0.28	21.7
4 cyl. 4-s			Baseline[a]	3.28	28.29	73.15	0.15	18.5	0.84	20.12	58.49	0.27	25.1
			2nd Base.	2.70	29.64	78.05	0.19	17.7	0.90	20.25	65.67	0.32	23.2
			Lean	2.44	13.39	93.46	0.30	19.3	0.53	5.46	78.66	0.56	26.2
			Rich	5.74	51.45	61.90	0.07	14.7	1.88	47.01	49.10	0.07	18.1
			Advanced	3.17	26.51	76.47	0.23	18.4	1.81	18.63	63.95	0.44	24.3

[a] average of two runs
[b] maximum speed during FET run, 87 kph (54 mph)
[c] FET speeds limited in some areas by 260°C maximum head temperature
[d] FET scaled down to 64% of normal

was limited by the criterion of 260°C maximum head temperature, which shortened the actual distance traveled by 1.41 km (nominal FET distance is 16.48 km). No comparative performance checks were made on any motorcycle during this phase.

The four carburetors of the Kawasaki KZ-900 were somewhat out of synchronization when the original baseline runs were performed. This problem did not seem to affect the baseline emissions themselves very much (comparing "second baseline" with proper synchronization to original baseline), but it did cause difficulties when the carburetors were moved out of recommended adjustment. Direct comparisons, therefore, should be made between the "second baseline" and the maladjusted conditions for this motorcycle.

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APPENDIX A

DATA ON INDIVIDUAL MOTORCYCLE MODELS

TABLE A-1 . STREET-LEGAL, FULL SIZE 1976 MOTORCYCLES, $500\ cm^3 <$ DISPLACEMENT

Manufacturer	Model	Engine type	Engine cyls.	Engine description	Displ. cm^3	Cooling	Vehicle type	Vehicle wt.,kg	Carb(s)	Exh(s)	Ign.	1975 Reg's
BMW	R60/6	4s	2	horiz-opp 46 hp @ 6600	599	air	S	210	2-26 Bing	2	B&C	958
BMW	R75/6	4s	2	horiz-opp 57 hp @ 6400	745	air	S	210	2-32 Bing	2	B&C	1,751
BMW	R90/6	4s	2	horiz-opp 69 hp @ 6700	898	air	S	210	2-32 Bing. ?	2	B&C	4,623
BMW	R90S	4s	2	horiz-opp 77 hp @ 7000	898	air	S	215	2-38 D.O.	2	B&C	
Benelli	650 Tornado S	4s	2	57 hp @ 7400	643	air	S	210	2-29 D.O.	2	B&C	49
Benelli	750 Sei	4s	6	76 hp @ 9000	748	air	S	220	3-29 D.O.	3	B&C	(new)
Ducati	860GT	4s	2	90°V-twin 60 hp @ 7000	864	air	S	211	2-32 D.O.	2	B&C or CDI	184
AMF/H-D	XL/XLCH 1000	4s	2	45°V-twin pushrod	995	air	S	212	(Kei ?) 1-38 Bend	2	B&C	18,165
AMF/H-D	FX-1200	4s	2	45°V-twin pushrod-hyd	1207	air	S	246	(Kei ?) 1-38 Bend	2	B&C	19,822
AMF/H-D	FLH-1200	4s	2	45°V-twin pushrod-hyd.	1207	air	S	327	(Kei?) 1-38 Bend	2	B&C	
Honda	CB550	4s	4		544	air	S	192	4-22 Kei	4	B&C	34,089
Honda	CB550F	4s	4		544	air	S	191	4-22 Kei	4-1	B&C	
Honda	CB750	4s	4		736	air	S	217	4-28 Kei	4	B&C	51,838
Honda	CB750F	4s	4		736	air	S	226	4-28 Kei	4-1	B&C	
Honda	CB750A	4s	4	Automatic detuned	736	air	S	247	acc pump 4-24Kei	4-1	B&C	(new)
Honda	GL1000	4s	4	horiz-opp	999	water	S	264	4-32 Kei	4-1	B&C	12,164
Kawasaki	KZ750	4s	2	DOHC 55 hp @ 7000	746	air	S	224	2-38 Mik	2	B&C	4,381
Kawasaki	KZ900	4s	4	DOHC 76 hp @ 8500	903	air	S	233	4-26 Mik	4	B&C	24,669
Kawasaki	KZ900LTD	4s	4	DOHC 76 hp @ 8500	903	air	S	236	4-26 Mik	4-2	B&C	

KEY: S - Street
S/T - Street/Trail

TABLE A-1 . STREET-LEGAL, FULL SIZE 1976 MOTORCYCLES, $500\text{cm}^3 <$ DISPLACEMENT (Cont'd)

Manufacturer	Model	Engine type	Engine cyls.	Engine description	Displ. cm^3	Cooling	Vehicle type	Vehicle wt., kg	Carb(s)	Exh(s)	Ign.	1975 Reg's
Laverda	750SF	4s	2		744	air	S	219	2-32 D.O.	2	B&C	———
Laverda	750SFC	4s	2		744	air	S	213	2-36 D.O.	2	B&C	———
Laverda	1000 Three	4s	3	DOHC	981	air	S	236	3-32 D.O.	3	CDI	———
MV Agusta	750S America	4s	4	DOHC 78 hp @ 9000	790	air	S	243	2-26 D.O.	2	B&C	———
Moto Guzzi	850T/2	4s	2	90° tran. V-twin, 68.5 @ 7000	844	air	S	240	2-30 D.O.	2	B&C	1,908
Moto Guzzi	V-1000, I-Convert	4s	2	90° trans. V-twin, 71 @ 6500	949	air	S	254	2-30 D.O.	2	B&C	(new)
Norton	Commando 850 Roadster	4s	2	? @ 5900	828	air	S	209	2-32 Amal	2	B&C	4,083
Norton	Commando 850 Interstate	4s	2	? @ 5900	828	air	S	212	2-32 Amal	2	B&C	
Suzuki	GT-550 Indy	2s	3		543	air	S	200	3-28 Mik	3?	B&C	7,925
Suzuki	GT-750 Le Mans	2s	3		738	water	S	230	3-40 Mik	3?	B&C	6,260
Triumph	Bonneville T140V	4S	2	? @ 7000	744	air	S	177	2-30 Amal	2	B&C	3,234
Triumph	Trident TI60	4s	3	? @ 7250	740	air	S	228	3-27 Amal	3?	B&C	
Yamaha	XS650C	4s	2	53 @ 7500	653	air	S	212	2-38 Mik	2	B&C	15,142
Yamaha	XS750C	4s	3	DOHC shaft drive	747	air	S	229	3-34 Mik	3-1	B&C	(new) (1,642)

KEY: S - Street
S/T - Street/Trail

TABLE A-2 . STREET-LEGAL, FULL SIZE 1976 MOTORCYCLES, 300 cm³ ≤ DISPLACEMENT ≤ 500 cm³

Manufacturer	Model	Engine			Displ. cm³	Cooling	Vehicle		Carb(s)	Exh(s)	Ign.	1975 Reg's
		type	cyls.	description			type	wt.,kg				
Benelli	500 Quattro	4s	4		498	air	S	210	4-22 D.O.	4	B&C	(new)
Carabela	400 Centauro Enduro	2s	1		397	air	S/T	102	1-36 Mik	1	CDI	———
Honda	XL350	4s	1	4-valve	348	air	S/T	142	1-32 Kei	1	Mag	12,260
Honda	CJ360T	4s	2		356	air	S	159	2-30 Kei	2-1	B&C	39,649
Honda	CB360T	4s	2		356	air	S	165	2-30 Kei	2	B&C	
Honda	CB400F	4s	4		408	air	S	170	4-20 Kei	4-1	B&C	9,814
Honda	CB500T	4s	2		498	air	S	193	2-32 Kei	2	B&C	10,566
Kawasaki	KZ400	4s	2	36 hp @ 8500	398	air	S	172	2-36 Kei	2	B&C	38,205
Kawasaki	KH400	2s	3	38 hp @ 7000	400	air	S	162	3-26 Mik	3	Mag.CDI	
Kawasaki	KH500	2s	3	52 hp @ 7000	498	air	S	192	3-28 Mik	3	Mag.CDI	5,697
Laverda	500 Twin	4s	2	DOHC 8-valve	496	air	S	168	2-32 D.O.	2	———	———
Moto Morini	350 Standard	4s	2	39 hp @ 8200 V-twin	344	air	S	———	———	———	solid state	(new)
Moto Morini	350 Cafe-sport	4s	2	42 hp @ 8500 V-twin	344	air	S	———	———	———	solid state	(new)
Moto Morini	500	4S	2	V-twin		air	S	———	———	———	solid state	(new)
Suzuki	GT-380	2s	2	"ram air"	371	air	S	171	2-24 Mik	2	B&C	8,039
Suzuki	Apache TS400	2s	1		396	air	S/T	124	1-32 Mik	1	CDI	7,230
Suzuki	Titan GT-500	2s	2		492	air	S	179	2-32 Mik	2	CDI	7,472
Suzuki	RE-5	rot	1 rot		497	water	S	245	1,18-32 Mik	1-2	CDI	
Yamaha	XS360C	4s	2		359	air	S	159	2-34 Mik	2	B&C	(new)
Yamaha	RD400C	2s	2	reed valve 38 hp @ 7000	398	air	S	166	2-28 Mik	2	B&C	11,554
Yamaha	DT400C	2s	1	reed valve 27 hp @ 5000	397	air	S/T	123	1-32 Mik	1	CDI	
Yamaha	XS500C	4s	2	DOHC	498	air	S	192	2-38 Mik	2	B&C	10,600
Yamaha	XT500C	4s	1		499	air	S/T	137	1-38 Mik	1	Mag	

KEY: S - Street
S/T - Street/Trail

TABLE A-3. STREET-LEGAL, FULL SIZE 1976 MOTORCYCLES, $170\ cm^3 < DISPLACEMENT < 300\ cm^3$

Manufacturer	Model	Engine			Displ. cm^3	Cooling	Vehicle		Carb(s)	Exh(s)	Ign.	1975 Reg's
		type	cyls.	description			type	wt.,kg				
Benelli	250 Phantom	2s	2	30 hp @ 7000	231	air	S	143	2-25 D.O.	2	CDI	91
CZ	175 Street	2s	1	16 hp @ 5900	172	air	S	112	—	—	—	1,120
CZ	175 Enduro	2s	1	18 hp @ 7000	172	air	S/T	110	—	—	—	
CZ	250 Enduro	2s	1	22 hp @ 6750	246	air	S/T	114	—	—	—	441
Can-Am	175 TNT Enduro	2s	1	rotary valve 25 hp @ 8500	174	air	S/T	108	1-32 Bing	1	CDI	1,296
Can-Am	250 TNT Enduro	2s	1	rotary valve 29 hp @ 8000	247	air	S/T	110	1-32 Bing	1	CDI	933
Carabela	175 Rally Enduro	2s	1	21 hp @ 7200	173	air	S/T	89	1-32 Mik	1	Mag	—
Carabela	200 Carrera Enduro	2s	1	22.3 hp @ 7100	199	air	S/T	96	1-32 Mik	1	Mag	—
Carabela	250 Centauro Enduro	2s	1	30.2 hp @ 6800	223	air	S/T	101	1-34 Mik	1	CDI	
(AMF)/H-D	SS-175	2s	1		174	air	S	116	1-27 D.O.	1	CDI	2,401
(AMF)/H-D	SX-175	2s	1		174	air	S/T	112	1-27 D.O.	1	CDI	
(AMF)/H-D	SS-250	2s	1		242	air	S	118	1-32 D.O.	1	CDI	3,912
(AMF)/H-D	SX-250	2s	1		242	air	S/T	114	1-32 D.O.	1	CDI	
Hercules	Wankel 2000	rot	1 rot	35 hp @ 6500	294	air	S	159	1-32 Bing	1-2	—	—
Honda	XL-175	4s	1		173	air	S/T	108	1-26 Kei	1	Mag	11,237
Honda	CB-200T	4s	2		198	air	S	132	2-20 Kei	2	B & C	12,409
Honda	XL-250	4s	1	4-valve head	248	air	S/T	136	1-28 Kei	1	Mag	16,938
Honda	MT-250	2s	1		248	air	S/T	118	1-28 Kei	1	Mag	
Kawasaki	KE 175	2s	1	16 hp @ 7000	174	air	S/T	105	1-26 Mik	1	CDI	9,094
Kawasaki	KH 250	2s	3	28 hp @ 7500	249	air	S	158	3-22 Mik	3	B & C	9,081
MZ	TS 250	2s	1	21 hp @ 5900	243	air	S	138	—	—	—	—
Montesa	Rapita 250 Street	2s	1	26 hp @ 6500	246	air	S	110	1-32 Amal	1	CDI	—
Montesa	250 King Scorpion	2s	1	26 hp @ 6500	246	air	S/T	110	1-32 Amal	1	CDI	—
Suzuki	GT-185 Adventurer	2s	2	"Ram air"	184	air	S	115	2-20 Mik	2	B & C	15,932 (incl. next 2 models)

KEY: S - Street
S/T - Street/Trail

TABLE A-3. STREET-LEGAL, FULL SIZE 1976 MOTORCYCLES, 170 cm³ < DISPLACEMENT < 300 cm³ (Cont'd)

Manufacturer	Model	Engine			Displ.	Cooling	Vehicle		Carb(s)	Exh(s)	Ign.	1975
		type	cyls.	description	cm^3		type	wt., kg				Reg's
Suzuki	TS-185 Sierra	2s	1		183	air	S/T	97	1-26 Mik	1	CDI	15,932 (incl. prev. model)
Suzuki	TC-185 Ranger	2s	1		183	air	S/T	118	1-24 Mik	1	CDI	
Suzuki	GT-250 Hustler	2s	2		247	air	S	146	2-28 Mik	2	B&C	12,495
Suzuki	TS-250 Savage	2s	1		246	air	S/T	109	1-28 Mik	1	CDI	
Yamaha	DT175C	2s	1	reed valve 16 hp @ 7500	171	air	S/T	100	1-24 Mik	1	Mag.	9,783
Yamaha	RD200C	2s	2	reed valve 22 hp @ 7500	195	air	S	116	2-20 Tei	2	B&C	1,959
Yamaha	DT250C	2s	1	reed valve 21 hp @ 6000	246	air	S/T	121	1-28 Mik	1	Mag.	18,346

KEY: S - Street
S/T - Street/Trail

TABLE A-4. STREET-LEGAL, FULL SIZE 1976 MOTORCYCLES, 100 cm^3 < DISPLACEMENT ≤ 170 cm^3

Manufacturer	Model	Engine			Displ. cm^3	Cooling	Vehicle		Carb(s)	Exh(s)	Ign.	1975 Reg's
		type	cyls.	description			type	wt.,kg				
Can-Am	125 TNT Enduro	2S	1	rotary valve 20 hp @ 8500	124	air	S/T	108	1-32 Bing	1	CDI	662
Carabela	125 Rally Enduro	2s	1	19 hp @ 7200	119	air	S/T	88	1-30 Mik	1	Mag	
CZ (Jawa)	125 street	2s	1	12 hp @ 5950	123	air	S	112				124
AMF/H-D	SS-125	2s	1		123	air	S	109	1-24 D.O.	1	B&C	2,413
AMF/H-D	SXT-125	2s	1		123	air	S/T	105	1-24 D.O.	1	B&C	
Honda	BC125	4s	1		124	air	S	93	1-24 Kei	1	B&C	27,525
Honda	XL125	4S	1		124	air	S/T	99	1-24 Kei	1	B&C	
Honda	MT125	2s	1		123	air	S/T	94	1-24 Kei	1	Mag	
Indian	ME125	2s	1	19 hp @ 7200	123	air	S/T	83				
Kawasaki	KE125	2s	1	rotary valve 13 hp @ 6500	124	air	S/T	98	1-24 Mik	1	Mag	6,908
Moto Morini	"125"	4s	1	15 hp @ 9000	123	air	S					
MZ	TS150	2s	1	? @ 6000	142	air	S	109				
Suzuki	Duster TS-125	2a	1		123	air	S/T	90	1-24 Mik	1	Mag	9,653
Suzuki	Prospector TC-125	2s	1		123	air	S/T	95	1-24 Mik	1	Mag	
Yamaha	RD-125C	2s	2	16 hp @ 9500	124	air	S	103	2-18 Tei	2	B&C	2,810
Yamaha	DT-125C	2s	1	13 hp @ 7000	123	air	S/T	104	1-24 Mik	1	B&C	

KEY: S - Street
S/T - Street/Trail

TABLE A-5. STREET-LEGAL, FULL SIZE 1976 MOTORCYCLES, 50 cm^3 ≤ DISPLACEMENT ≤ 100 cm^3

Manufacturer	Model	Engine type	Engine cyls.	Engine description	Displ. cm^3	Cooling	Vehicle type	Vehicle wt., kg	Carb(s)	Exh(s)	Ign.	1975 Reg's
Benelli	Trail 90	2s	1		90	air	S/T	86	———	1	———	———
Carabela	100 Rally Enduro	2s	1	15.8 hp @ 7200	100	air	S/T	87	1-30 Mik	1	Mag.	———
Hodaka	Road Toad 100	2s	1	? @ 7800	98	air	S/T	104	1-26 Mik	1	Mag.	2,296
Honda	CT90	4s	1		90	air	S/T	90	1-16 Kei	1	B&C	10,108
Honda	XL-100	4s	1		99	air	S/T	93	1-22 Kei	1	B&C	8,976
Indian	MS-100	2s	1		97	air	S/T	78	———	———	———	———
Indian	ME-100A	2s	1	10 hp @ 7200	97	air	S/T	80	———	———	———	———
Kawasaki	KH100	2s	1	10.5 hp @ 7500	99	air	S	85	1-19 Mik	1	Mag.	15,197
Kawasaki	KE100	.2s	1	11 hp @ 7500	99	air	S/T	91	1-19 Mik	1	Mag.	
Kawasaki	KV100	2s	1	11 hp @ 7500	99	air	S/T[a]	97	1-19 Mik	1	Mag.	
Suzuki	(Go-Fer) A-100)	2s	1	rot. valve	98	air	S	83	1-20 Mik	1	---	8,121
Suzuki	(Honcho) TS-100	2s	1	rot. valve	98	air	S/T	92	1-19 Mik	1	Mag.	
Suzuki	(Blazer) TC-100	2s	1	rot. valve	98	air	S/T[a]	93	1-19 Mik	1	Mag.	
Yamaha	RS-100C	2s	1	10.5 hp @ 8000 reed valve	97	air	S	89	1-20 Mik	1	Mag.	10,082
Yamaha	DT-100C	2s	1	10 hp @ 7500 reed valve	97	air	S/T	93	1-22 Mik	1	Mag.	

KEY: S - Street
S/T - Street/Trail

APPENDIX B

DRIVEABILITY PROCEDURE FOR TEST MOTORCYCLES AND COMPLETED ROAD EVALUATION FORMS

Motorcycle	Page
Honda CB-360	B-5 to B-11
Kawasaki KZ-900	B-11 to B-18
Honda XL-125	B-18 to B-22
Suzuki RE-5	B-22 to B-24
Honda GL-1000	B-25 to B-26
Yamaha RD-400	B-27 to B-29
Kawasaki KH-500	B-30 to B-34
Kawasaki KE-175	B-35 to B-39
Suzuki TS-100	B-39 to B-42
Suzuki GT-750	B-43 to B-45

MOTORCYCLE DRIVEABILITY EVALUATION

1. motorcycles are all to be driven for at least 10 minutes on the day prior to first day of driveability evaluation

2. first day - cold starts by driver A, hot starts by driver B

3. second day - cold starts by driver B, hot starts by driver A

TEST PROCEDURE		
Mode	Time initiated, min : sec	Description
1	————	crank engine until it starts - technician not riding records time to start + number of cranks/kicks, choke usage, number of times engine died, etc.
2	0 : 00	idle - throttle & choke can be used to keep engine running - all such action to be recorded
3	0 : 30	easy accel through gears out south driveway to Institute road and stop (start behind building 87)
4	————	left on Institute road - easy accel. to max. speed of 35 mph - cruise to "Y" near building 71 and stop
5	————	reverse direction on Institute road - easy accel. to max. speed of 35 mph - cruise back to building 87 and stop behind building
6	"I"	idle
7	"I" + 1 : 00	stop engine
8	"I" + 3 : 00	crank engine and record data as above
——	————	drive out front gate and west on Culebra far enough to check the following, then return to bldg. 87:
9	————	[a]45 mph cruise performance (twice)
10	————	[a]30-50 mph one-gear accel (twice)
11	————	[a]50-20 mph in-gear decel (twice)
12	————	[b]WOT accel through gears to 55 mph (twice)

[a] highest gear in which performance is acceptable

[b] without wheel spin - use full shift sequence

MOTORCYCLE DRIVEABILITY EVALUATION

TERMS DESCRIBING ENGINE PERFORMANCE

IDLE QUALITY - An evaluation of vehicle smoothness with the engine idling, as judged from the driver's seat

STALL - Any occasion during a test that the engine stops while the engine is on

STUMBLE - A short, sharp reduction in acceleration rate

HESITATION - A temporary lack of initial response in acceleration rate

BACKFIRE - An explosion in the induction or exhaust system

SURGE - A continued condition of short, sharp fluctuations in power. These may be cyclic or random and can occur at any speed and/or load. Surge is usually caused by excessively lean carburetor mixture.

STRETCHINESS - A lack of anticipated response to throttle movement. This may occur on slight throttle movement from road load or during light to moderate accelerations.

VIBRATION - Low- or high-frequency physical sensations at points of contact with vehicle, or visible shaking of vehicle parts

NOISE - Sounds emitted by the vehicle which seem out of harmony with its operation

HEAT - Heat perceived from any part of the vehicle which seems to be potentially uncomfortable or dangerous

SMOKE OR ODORS - Any smoke or odors given off by the vehicle which seem to be potentially bothersome or injurious

RATING SEVERITY

Trace - A condition that would be noticeable to a technically trained and experienced driver

Moderate - A condition that would be noticeable to the driving public

Heavy - A condition that would be objectionable to the driving public

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle ____________ Date ____________ Temp. ________ Barometer ________
Driver ____________ Assisting Technician ____________
Motorcycle status ____________ Odometer reading ____________
Cold start? ________ Hot start? ________

Initial start: Time ____ sec; Cranks ____; Kicks ____; Choke ____; Other ____________
Second start: Time ____ sec; Cranks ____; Kicks ____; Choke ____; Other ____________

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2			___	___		___	___				
3	___										
4	___										
5	___										
6			___	___		___	___				
7	___	___	___	___		___	___				
9	___		___	___			___				
10											
11			___	___							
12											

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB 360 Date 12-20-76 Temp. 48° Barometer 29.45
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status Stock Odometer reading 909.4
Cold start? X 72° Hot start? ______

Initial start: Time 3 sec; Cranks 1 ; Kicks ____ ; Choke X ; Other choke on for 15
Second start: Time 2 sec; Cranks 1 ; Kicks ____ ; Choke ____ ; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	GOOD	N	—	—	N	—	—	N	N	N	N
3	—	N	N	N	N	N	N	N	N	N	N
4	—	1	N	N	N	N	N	N	T	N	N
5	—	N	N	N	N	N	N	N	T	N	N
6	GOOD	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	T	T	N	N
10	GOOD	N	N	N	N	N	T	T	T	N	N
11	GOOD	N	—	—	T	N	N	T	T	N	N
12	GOOD	N	N	N	N	N	N	T	T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB 360 Date 12-16-76 Temp. 69°F Barometer 29.37
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status Stock Odometer reading 614.4
Cold start? X 76°F Hot start? ______

Initial start: Time 6 sec; Cranks 2 ; Kicks ____ ; Choke X ; Other choke for 5 sec.
Second start: Time 2 sec; Cranks 1 ; Kicks ____ ; Choke ____ ; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	GOOD	N	—	—	N	—	—	N	N	N	N
3	—	N	N	N	N	N	N	N	N	N	N
4	—	N	N	N	N	N	N	N	N	N	N
5	—	N	T	T	N	T	T	T	T	N	N
6	GOOD	N	—	—	N	—	—	T	M	T	N
7	—	—	—	—	N	—	—	N	N	T	N
9	—	N	—	—	N	T	—	T	T	T	N
10	GOOD	N	T	T	N	T	N	T	T	N	N
11	GOOD	N	—	—	T	N	N	T	N	N	N
12	GOOD	N	T	N	N	T	N	T	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB 360 Date 4/13/77 Temp. 77°F Barometer 29.16
Driver Kenneth Norman Assisting Technician Jim Boylan
Motorcycle status 750 K carb. # 115 main jet Odometer reading 662.9
Cold start? ______ Hot start? X

Initial start: Time 3 sec; Cranks 3 sec; Kicks ____; Choke ____; Other ______
Second start: Time 2 sec; Cranks ____; Kicks ____; Choke ____; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	----			N			N	N	T	N
3		----	N	N	N	N	N	N	N	N	N
4		----	N	N	N	N	N	N	N	N	N
5		----	N	N	N	N	N	N	N	N	N
6	Fair	----			N			N	N	T	N
7					N			N	N	T	N
9		----			N	N		N	N	N	N
10		----	N	T	N	N	N	N	N	N	N
11		----			N	N	N	N	N	N	N
12		----	N	N	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB 360 Date 4/27/77 Temp. 84°F Barometer 29.26
Driver Jim Boylan Assisting Technician Kenneth Norman
Motorcycle status CDI + 750 K Carb. # 105 Odometer reading 696.5
Cold start? X Hot start? ______

Initial start: Time 5 sec; Cranks -- ; Kicks -- ; Choke X ; Other choke on 10 sec.
Second start: Time 2 sec; Cranks -- ; Kicks -- ; Choke -- ; Other ---

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Good	N			N			N	N	N	TRACE
3		N	N	N	N	N	N	N	N	N	N
4		N	N	N	N	N	N	N	N	N	N
5		N	N	N	N	N	N	N	N	N	N
6	Good	N			N			N	N	N	N
7					N			N	N	N	N
9		N			N	N		N	N	N	N
10	Good	N	TRACE	TRACE	N	TRACE	TRACE	N	N	N	TRACE
11	Good	N			N	N	N	N	N	N	N
12	Good	N	TRACE	TRACE	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: # 10; # 12 at full throttle motorcycle would bog down, at 3/4 throttle it wouldrun good, full throttle could be applied above 40 mph

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB-360 Date 4/28/77 Temp. 81°F Barometer 29.24
Driver Kenneth Norman Assisting Technician Jim Boylan
Motorcycle status CDI + 750 K Carb. # 105 Odometer reading 709.
Cold start? X Hot start? ______

Initial start: Time 3 sec; Cranks 3 sec; Kicks ____; Choke X ; Other choke on 10 sec.
Second start: Time 2 sec; Cranks 2 sec; Kicks ____; Choke --- ; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Good		---	---	N	---	---	N	N	N	TRACE
3	--	N	N	TRACE	N	N	TRACE	N	N	N	N
4	—	N	N	N	N	N	N	N	N	N	N
5	—	N	N	N	N	N	N	N	N	N	N
6	Good	N	---	---	N	---	---	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	---	N	—	—	N	N	—	N	N	N	N
10	Good	N	N	N	N	N	N	N	N	N	N
11	Good	N	—	—	TRACE	N	N	N	N	N	N
12	Good	N	N	TRACE	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Ran Good

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB-360T Date 7/12/77 Temp. 94°F Barometer 29.21
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status 750 Carbs + CDI + Thermal Reactors, 10° Retard Odometer reading 727.0
Cold start? x Hot start? ______

Initial start: Time 5 sec; Cranks 5 sec; Kicks ____; Choke 10 sec; Other Choke to start
Second start: Time 3 sec; Cranks 3 sec; Kicks ____; Choke ____; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	N	---	---	T	---	—	N	N	N	T
3	—	N	T	T	T	N	N	N	N	N	N
4	—	N	T	T	T	N	T	N	N	N	N
5	—	N	N	N	T	N	T	N	N	N	N
6	Good	1	-	---	T	---	---	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	T	T	—	N	N	N	N
10	Good	N	T	T	N	T	T	N	N	N	N
11	Good	N	—	—	T	N	N	N	N	N	N
12	Good	N	T	T	N	T	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB360T Date 7/13/77 Temp. 95°F Barometer 29.29
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status 750 Carbs Lean + Thermal Reactors, 10° Odometer reading 738.9
Cold start? X Hot start? ______ Retard

Initial start: Time 2 sec; Cranks ____; Kicks 1 ; Choke ____; Other ______
Second start: Time 10 sec; Cranks ____; Kicks 5 ; Choke ____; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	N	—	—	N	—	—	N	N	N	T
3	—	1	M	M	T	M	M	N	N	N	N
4	—	1	M	M	T	M	M	N	N	N	N
5	—	N	M	M	N	M	M	N	N	N	N
6	Poor	1	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	T	—	N	N	N	N
10	Poor	N	T	M	N	T	T	N	N	N	N
11	Poor	N	—	—	N	N	N	N	N	N	N
12	Poor	M	M	H	N	T	T	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Motorcycle would not run with throttle wide open; it would bog down and load up. Only half throttle could be used.

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB-360 Date 7/27/77 Temp. 83°F Barometer 29.25
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status CDI, Lean 750 Carbs, Stock Pipes Odometer reading 751.6
Cold start? X Hot start? ______

Initial start: Time 10 sec; Cranks 10 seq Kicks ____; Choke ____; Other ______
Second start: Time 25 sec; Cranks 25 seq Kicks ____; Choke ____; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	N	—	—	T	—	—	N	N	N	T
3	—	N	T	T	N	N	N	N	N	N	N
4	—	N	T	T	N	T	T	N	N	N	N
5	—	N	T	T	N	T	T	N	N	N	T
6	Fair	N	—	—	T	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	T	N	—	N	N	N	N
10	Fair	N	N	N	T	N	N	N	N	N	N
11	Fair	N	—	—	T	N	N	N	N	N	N
12	Fair	N	N	N	T	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB-360T Date 8/15/77 Temp. 90°F Barometer 29.13
Driver Rick Assisting Technician Jim Boylan
Motorcycle status Rich 750K Carbs. + CDI + Thermal Odometer reading 790.6
Cold start? ______ Hot start? ______ Reactors + Air)

Initial start: Time 5 sec; Cranks ____; Kicks ____; Choke ____; Other ______
Second start: Time 1 sec; Cranks ____; Kicks ____; Choke ____; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	2	—	—	N	—	—	N	N	N	N
3	—	N	N	N	N	N	T	T	N	N	N
4	—	N	T	T	N	T	N	T	N	N	N
5	—	1	T	T	T	N	N	T	N	N	N
6	Poor	1	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	T	T	—	N	N	N	N
10	Poor	N	T	T	T	N	T	T	N	N	N
11	Poor	N	—	—	N	T	T	T	N	N	N
12	Poor	N	T	N	N	T	T	T	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB-360T Date 8/16/77 Temp. 81° Barometer 29.29
Driver Jim Boylan Assisting Technician Rick
Motorcycle status Rich 750K Carbs. + CDI + Thermal Reactor Odometer reading 807.4
Cold start? X Hot start? ______ + Air

Initial start: Time 5 sec; Cranks ____; Kicks ____; Choke X; Other Choke on 30 sec.
Second start: Time 2 sec; Cranks ____; Kicks ____; Choke ____; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	1	—	—	N	—	—	N	N	N	N
3	—	1	N	T	T	N	T	N	N	N	N
4	—	N	T	T	N	N	T	N	T	N	N
5	—	N	T	T	N	N	T	N	T	N	N
6	Poor	1	—	—	N	—	—	N	N	T	N
7	—	—	—	—	N	—	—	N	N	T	N
9	—	N	—	—	T	N	—	N	T	T	N
10	Poor	N	T	T	T	N	T	T	N	N	N
11	Poor	N	—	—	N	N	N	N	T	N	N
12	Poor	N	N	N	N	N	N	N	T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: If throttle opened all the way, engine would bogg down; ok at 3/4 throttle

noise from pump

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB 360 Date 8/19/77 Temp. 95° Barometer 29.07
Driver Jim Boylan Assisting Technician Rick
Motorcycle status Lean 750K Carbs. + CAT + AIR + CID Odometer reading 816.1
Cold start? X Hot start? ____

Initial start: Time 5 sec; Cranks ____; Kicks ____; Choke X; Other Choke used 30 sec
Second start: Time 5 sec; Cranks ____; Kicks ____; Choke —; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	1	—	—	T	—	—	N	N	N	T
3	—	1	T	T	T	T	T	N	N	N	N
4	—	N	N	N	N	N	N	N	N	N	N
5	—	N	N	N	N	N	N	N	N	N	N
6	Poor	N	—	—	T	—	—	N	N	T	N
7	—	—	—	—	N	—	—	N	N	T	N
9	—	N	—	—	N	N	—	N	T	M	N
10	Poor	N	N	N	N	N	N	N	T	M	N
11	Poor	N	—	—	T	T	N	N	T	M	N
12	Poor	N	N	N	T	N	N	N	T	M	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Very poor performance

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB-360 Date 8/31/77 Temp. 88°F Barometer 29.07
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status Stock Carb. + CDI + CAT + AIR (0040 @ 0.5:1) Odometer reading 853.6
Cold start? Forced Hot start? ____

Initial start: Time 2 sec; Cranks ____; Kicks ____; Choke X; Other Choke on 5 sec
Second start: Time 2 sec; Cranks ____; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	N	—	—	N	—	—	T	T	N	T
3	—	N	N	N	N	N	N	N	T	N	N
4	—	N	N	N	N	N	N	N	T	N	N
5	—	N	N	N	N	N	N	N	T	N	N
6	Good	N	—	—	T	—	—	N	T	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	T	T	N	N
10	Good	N	N	N	N	N	N	T	T	N	N
11	Good	N	—	—	T	N	N	N	T	N	N
12	Good	N	N	N	N	N	N	N	T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda CB-360T Date 8/31/77 Temp. 95° Barometer 29.06
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status Stock Carb. + CID + Air (004 at 0.5:1) Odometer reading 842.0
Cold start? Forced Hot start? ______

Initial start: Time 5 sec; Cranks ____; Kicks ____; Choke X ; Other Choke on 15 sec.
Second start: Time 3 sec; Cranks ____; Kicks ____; Choke ____; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	N	—	—	N	—	—	T	T	N	T
3	—	N	N	T	N	N	T	T	T	N	N
4	—	N	N	T	N	N	T	M	M	N	N
5	—	N	N	N	N	N	N	M	M	T	N
6	Good	N	—	—	N	—	—	T	T	M	N
7	—	N	—	—	N	—	—	N	N	M	N
9	—	N	—	—	N	N	—	M	M	M	N
10	Good	N	M	M	N	T	M	H	M	M	N
11	Good	N	—	—	T	N	N	M	T	M	N
12	Good	N	M	T	N	M	T	H	H	M	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Vibration from pump
: DOT operation - engine bogs - must shift at 6500 to 6700 rpm
: Heat from catalyst

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle KZ-900 Date 12-21-77 Temp. 47°F Barometer 29.45
Driver Ken Assisting Technician Jimbo
Motorcycle status Stock Odometer reading 960.4
Cold start? X 70° Hot start? ______

Initial start: Time 25 sec; Cranks 4 ; Kicks ____; Choke ____ Other wouldn't idle, had to choke to keep
Second start: Time 4 sec; Cranks 1 ; Kicks ____; Choke ____; Other it running 10 min

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	POOR	4	—	—	N	—	—	N	N	N	N
3	—	1	M	M	N	M	M	N	N	N	N
4	—	N	N	M	N	M	T	N	N	N	N
5	—	N	N	T	N	T	N	N	N	N	N
6	POOR	1	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	N
10	FAIR	N	T	T	N	T	T	T	N	N	N
11	GOOD	N	—	—	N	N	N	T	N	N	N
12	GOOD	N	T	T	N	T	T	T	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle KZ-900 Date 1-07-77 Temp. 64 Barometer 29.21
Driver Ken Assisting Technician Jimbo
Motorcycle status Stock Odometer reading 5989.0
Cold start? X 73°F Hot start?

Initial start: Time 33 sec; Cranks 4 ; Kicks ; Choke X ; Other choke on for 25 sec.
Second start: Time 3 sec; Cranks 1 ; Kicks ; Choke ; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	FAIR	N	—	—	N	—	—	N	N	N	N
3	—	N	N	N	N	N	N	N	N	N	N
4	—	N	N	N	N	N	N	N	N	N	N
5	—	N	N	N	N	N	N	N	N	N	N
6	GOOD	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	— —	—	N	N	—	N	N	N	N
10	GOOD	N	T	T	N	T	T	N	N	N	N
11	GOOD	N	—	—	N	N	N	N	N	N	N
12	GOOD	N	M	M	N	M	M	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 2-8-77 Temp. 62° Barometer 29.00
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status 1st step control-pilot air screws out 2 1/4 Odometer reading 1015.1
Cold start? x 72° Hot start?

Initial start: Time 15 sec; Cranks 3 ; Kicks ; Choke X ; Other False start, choke used intermitently for 30 sec
Second start: Time 3 sec; Cranks 1 ; Kicks ; Choke --- ; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	3	—	—	N	—	—	N	N	N	T
3	—	1	T	M	N	M	M	N	N	N	N
4	—	N	T	M	N	M	M	N	N	N	N
5	—	N	T	M	N	M	M	N	N	N	N
6	Poor	2	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	M	—	N	N	N	N
10	Poor	N	H would not do 30 mph to 50 mph WOT	H	H	H	H	N	N	N	N
11	Poor	N	—	—	N	N	N	T	N	N	N
12	Poor	N	T	N	N	N	N	T	T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 2-11-77 Temp. 72° Barometer 29.20
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status 1st step control-pilot air screws out 2 1/4 Odometer reading 1030.0
Cold start? x 76° Hot start? ____

Initial start: Time 5 sec; Cranks 1 ; Kicks ____; Choke x ; Other Choked to start, 15 sec
Second start: Time 2 sec; Cranks 1 ; Kicks ____; Choke --- ; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	1	—	—	N	—	—	T	N	N	N
3	—	1	M	T	N	H	M	N	N	N	N
4	—	N	T	M	N	M	M	N	N	N	N
5	—	N	T	M	N	M	M	N	N	N	N
6	Good	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	M	—	T	N	N	N
10	Good	N	M	M	N	M	M	T	N	N	N
11	Good	N	—	—	N	N	N	T	N	N	N
12	Good	N	M	M	N	M	M	T	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 3-16-77 Temp. 81° Barometer 29.15
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status Pilot Air - 1 3/4 out: top clip position Odometer reading 1052.2
Cold start? x Hot start? ____

Initial start: Time 3 sec; Cranks ____; Kicks ____; Choke x ; Other 1/2 choke used 60 sec
Second start: Time 1 sec; Cranks ____; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	6	—	—	N	—	—	N	N	N	T
3	—	1	N	M	N	M	M	N	N	N	T
4	—	1	N	T	N	T	T	N	N	N	N
5	—	1	N	T	N	T	T	N	N	N	N
6	Fair	1	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	T	N
10	Good	N	N	worked best with 3/4 throttle N	N	N	H	N	N	T	N
11	Good	N	—	—	N	N	N	N	N	T	N
12	Good	N	N	N	N	N	N	T	N	T	N

RATINGS - idle quality: good, fair, or poor heat from pipes on ankles
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 3-17-77 Temp. 87° Barometer 28.79
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status Pilot Air -1 3/4 out: top clip position Odometer reading 1066.5
Cold start? X Hot start?

Initial start: Time 5 sec; Cranks 4 ; Kicks ; Choke X ; Other 3/4 choke used 60 sec
Second start: Time 2 sec; Cranks 2 ; Kicks ; Choke ; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	N	—	—	N	—	—	N	N	N	T
3	—	N	T	T	N	N	T	N	N	N	N
4	—	N	T	N	N	N	N	N	N	N	N
5	—	N	N	N	N	N	N	N	N	N	N
6	Good	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	N
10	Good	N	T	N	N	N	N	T	N	N	N
11	Good	N	—	—	N	N	N	T	N	N	N
12	Good	N	T	N	N	T	N	T	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

hesitation when a lot of throttle used

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 5/31/77 Temp. 93°F Barometer 29.26
Driver Ken Norman Assisting Technician Clay Suhler
Motorcycle status lean carbs + CDI + air injection Odometer reading 1121.5
Cold start? ✓ Hot start?

Initial start: Time 15 sec; Cranks 6 ; Kicks -- ; Choke X ; Other choke used 30 sec
Second start: Time 4 sec; Cranks 3 ; Kicks -- ; Choke -- ; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	poor	1	—	—	N	—	—	T	N	N	N
3	—	N	M	M	N	M	M	T	N	N	N
4	—	N	T	T	N	M	M	N	N	N	N
5	—	N	T	N	N	T	T	N	N	N	N
6	fair	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	T	—	T	T	N	N
10	good	N	N	N	N	N	N	N	N	N	N
11	good	N	—	—	N	N	N	T	T	N	N
12	good	N	N	N	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Noise from pump drive guard

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 6/1/77 Temp. 80°F Barometer 29.20
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status lean carbs, CDI, air pump inj. Odometer reading 1136.7
Cold start? ✓ Hot start? ____

Initial start: Time 2 sec; Cranks -- ; Kicks -- ; Choke X ; Other choke used 60 sec (full)
Second start: Time 1 sec; Cranks -- ; Kicks -- ; Choke -- ; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	poor	1	—	—	N	—	—	T	M	N	N
3	—	N	M	M	N	T	T	T	M	N	N
4	—	N	M	M	N	T	T	T	M	N	N
5	—	N	T	T	N	T	T	T	M	N	N
6	fair	N	—	—	N	—	—	T	M	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	T	—	T	M	N	N
10	good	N	N	N	N	T	N	T	M	N	N
11	good	N	—	—	N	N	N	T	M	N	N
12	good	N	N	T	N	T	N	T	M	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Noise from pump drive guard

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 6/11/77 Temp. 90°F Barometer 29.09
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status lean, CDI + air + port liners Odometer reading 1149.0
Cold start? ✓ Hot start? ____

Initial start: Time 5 sec; Cranks ____; Kicks ____; Choke 30 sec; Other full choke to start then half choke
Second start: Time 3 sec; Cranks ____; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	poor	N	—	—	T	—	—	N	N	N	T
3	—	N	H	H	N	H	N	N	N	N	N
4	—	N	H	M	N	M	M	N	N	N	N
5	—	N	M	T	N	T	T	N	N	N	N
6	fair	N	—	—	T	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	T	—	N	N	N	N
10	good	N	T	T	N	T	T	N	N	N	N
11	good	N	—	—	N	N	N	N	N	N	N
12	good	N	N	N	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 6/13/77 Temp. 100°F Barometer 29.16
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status lean, CDI + air + port liners Odometer reading 1160.7
Cold start? ✓ Hot start? ____

Initial start: Time 5 sec; Cranks ____; Kicks ____; Choke ✓; Other ____
Second start: Time 3 sec; Cranks ____; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	poor	1	—	—	N	—	—	N	N	N	T
3	—	N	T	M	N	M	M	N	N	N	N
4	—	N	T	M	N	M	M	T	T	N	N
5	—	N	T	T	N	T	T	T	T	N	N
6	fair	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	T	—	T	T	M	N
10	good	N	N	T	N	T	N	T	T	T	N
11	good	N	—	—	N	N	N	N	N	T	N
12	good	N	N	N	N	N	N	N	N	T	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Noise and vibration from air pump.

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 8/1/77 Temp. 83°F Barometer 29.27
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status CDI + Lean Carb. + Port Liners + Air Odometer reading 1192.9
Cold start? X Hot start? ____

Initial start: Time 3 sec; Cranks ____; Kicks ____; Choke X; Other Choke used 60 sec
Second start: Time 2 sec; Cranks ____; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	N	—	—	N	—	—	N	T	N	T
3	—	N	T	T	N	T	T	N	T	N	N
4	—	N	M	M	N	M	M	N	T	N	N
5	—	N	T	T	N	T	T	N	T	N	N
6	Good	N	—	—	N	—	—	N	T	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	T	—	N	T	N	N
10	Good	N	T	T	N	T	M	N	T	N	N
11	Good	N	—	—	N	N	N	N	T	N	N
12	Good	N	T	N	N	T	T	N	T	N	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: noise from pump

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 8/3/77 Temp. 95°F Barometer 29.07
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status CDI + Lean Carb. + Port Liners + Air Odometer reading 1206.0
Cold start? X Hot start? ____

Initial start: Time 3 sec; Cranks ____; Kicks ____; Choke X; Other Choke used 60 sec
Second start: Time 2 sec; Cranks ____; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	N	—	—	N	—	—	N	T	N	N
3	—	N	N	T	N	N	T	N	T	N	N
4	—	N	N	T	N	N	T	T	T	N	N
5	—	N	N	T	N	N	T	T	T	N	N
6	Good	N	—	—	N	—	—	N	T	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	T	T	N	N
10	Good	N	T	T	N	N	T	T	T	N	N
11	Good	N	—	—	N	N	N	N	T	N	N
12	Good	N	N	N	N	N	N	T	T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Vibration and noise from pump

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 8/10/77 Temp. 82°F Barometer 29.20
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status Lean + CDI + P.L. + Air + Cat. Odometer reading 1227.7
Cold start? X Hot start? ____

Initial start: Time 5 sec; Cranks 3; Kicks ____; Choke ____; Other Choke used 60 sec
Second start: Time 1 sec; Cranks 1; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	N	—	—	N	—	—	N	M	N	M
3	—	N	T	M	N	N	T	N	M	N	N
4	—	N	T	M	N	T	T	T	M	N	N
5	—	N	T	T	N	T	T	T	M	T	N
6	Good	N	—	—	N	—	—	N	N	T	N
7	—	—	—	—	N	—	—	N	N	T	N
9	—	N	—	—	N	T	—	T	M	T	N
10	Good	N	N	N	N	N	T	T	M	T	N
11	Good	N	—	—	N	N	N	T	T	T	N
12	Good	N	T	T	N	N	N	M	M	T	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Vibration and noise from air pump
Heat noted on bottom of feet due to catalyst location

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KZ-900 Date 8/11/77 Temp. 93°F Barometer 29.20
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status Lean + CDI + P.L. + Air + Cat. Odometer reading 1238.7
Cold start? X Hot start? ____

Initial start: Time 3 sec; Cranks 3 sec ; Kicks ____; Choke 50 sec ; Other Full choke to start/ 1/2 choke thereafter
Second start: Time 2 sec; Cranks 2 sec ; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	N	—	—	N	—	—	N	T	N	N
3	—	N	N	N	N	N	N	T	T	N	N
4	—	N	T	T	N	T	T	T	T	N	N
5	—	N	T	N	N	T	T	T	T	N	N
6	Good	N	—	—	N	—	—	N	T	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	N
10	Good	N	N	N	N	N	N	N	N	N	N
11	Good	N	—	—	N	N	N	T	T	N	N
12	Good	N	N	N	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda XL 125 Date 12-16-76 Temp. 69°F Barometer 29.38
Driver Jimbo Assisting Technician Ken
Motorcycle status Stock Odometer reading 578.6
Cold start? X 76°F Hot start? ____

Initial start: Time 15 sec; Cranks ____; Kicks 4 ; Choke X ; Other choke on 17 sec.
Second start: Time 5 sec; Cranks ____; Kicks 2 ; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	POOR	1	—	—	N	—	—	M	M	N	N
3	—	N	N	N	N	N	N	M	M	N	N
4	—	1	N	N	N	N	N	M	M	N	N
5	—	N	N	N	N	N	N	M	M	N	N
6	FAIR	N	—	—	N	—	—	M	M	N	N
7	—	—	—	—	N	—	—	M	M	N	N
9	—	N	—	—	N	N	—	M	M	N	N
10	FAIR	N	N	N	N	N	N	M	M	N	N
11	FAIR	N	—	—	N	N	N	M	M	N	N
12	FAIR	1	N	N		N	N	M	M	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle HONDA XL 125 Date 12-20-76 Temp. 52°F Barometer 29.46
Driver Ken Assisting Technician Jimbo
Motorcycle status Stock Odometer reading 591.4
Cold start? X 72° Hot start? ____

Initial start: Time 15 sec; Cranks ____; Kicks 6; Choke 15 sec; Other choke on just to start
Second start: Time 2 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	POOR	2	—	—	N	—	—	T	N	N	N
3	—	N	N	N	N	T	N	N	N	N	N
4	—	N	N	N	N	T	N	T	N	N	N
5	—	N	N	N	N	T	N	T	N	N	N
6	FAIR	1	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	N
10	FAIR	N	T	N	N	T	T	N	N	N	N
11	GOOD	N	—	—	N	N	N	N	N	N	N
12	GOOD	N	T	N	N	T	N	T	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda XL-125 Date 4/08/77 Temp. 84°F Barometer 29.40
Driver Kenneth Norman Assisting Technician Jim Boylan
Motorcycle status Air injection pump at 1.33:2 Odometer reading 628.7
Cold start? x Hot start? ____

Initial start: Time 2 sec; Cranks ____; Kicks 1; Choke ____; Other ____
Second start: Time 2 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	1	—	—	N	—	—	T	--	--	N
3	—	N	N	T	N	N	T	T	N	N	N
4	—	N	N	T	N	N	T	T	T	N	N
5	—	N	N	T	N	N	T	T	T	N	N
6	Fair	1	—	—	N	—	—	T	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	T	N	N	N
10	Good	N	T	N	N	N	T	T	N	N	N
11	Good	N	—	—	1	N	N	T	N	N	N
12	Good	N	T	T	N	N	T	T	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: # 4, # 5 : air injection pump drive making noise

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda XL-125 Date 4/13/77 Temp. 77°F Barometer 29.16
Driver Jim Boylan Assisting Technician Kenneth Norman
Motorcycle status air injection pump at 1.33:2 Odometer reading 641.4
Cold start? X Hot start?

Initial start: Time 2 sec; Cranks ___; Kicks 1; Choke x; Other choke on 5 sec.
Second start: Time 2 sec; Cranks ___; Kicks 1; Choke ___; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	1	—	—	N	—	—	N	N	N	T
3	—	N	N	N	N	N	N	N	N	N	N
4	—	N	N	N	N	N	1st gear T	N	N	N	N
5	—	N	N	N	N	N	1st gear T	N	N	N	N
6		N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	N
10	Fair	N	N	N	N	N	N	N	N	N	N
11	Fair	N	—	—	N	N	N	N	N	N	N
12	Fair	N	N	N	N	N	50 to 55 mph T	T	T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda XL-125 Date 5/17/77 Temp. 76°F Barometer 29.17
Driver Ken Norman Assisting Technician Clay Suhler
Motorcycle status CDI + lean carb + air inj Odometer reading 668.0
Cold start? ✓ Hot start?

Initial start: Time 5 sec; Cranks --; Kicks 3; Choke X; Other choke on 3 sec to start
Second start: Time 3 sec; Cranks --; Kicks 1; Choke --; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	fair	N	—	—	N	—	—	N	N	N	T
3	—	N	N	N	N	N	T	N	N	N	N
4	—	N	N	N	N	N	N	N	N	N	N
5	—	N	N	N	N	N	N	N	N	N	N
6	good	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	N
10	good	N	T	N	N	T	T	N	N	N	N
11	good	N	—	—	N	N	N	N	N	N	N
12	good	N	T	N	N	T	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Ran good

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda XL-125 Date 5/18/77 Temp. 75 Barometer 29.16
Driver Clay Suhler Assisting Technician Ken Norman
Motorcycle status CDI + lean carb + air inj Odometer reading 669.2
Cold start? ✓ Hot start? ____

Initial start: Time 20 sec; Cranks --; Kicks 2; Choke X; Other choke used 10 sec
Second start: Time 5 sec; Cranks --; Kicks 1; Choke --; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	poor	1	—	—	N	—	—	N	N	N	N
3	—	N	N	N	N	N	N	N	N	N	N
4	—	N	N	N	N	N	N	N	N	N	N
5	—	N	N	N	N	N	N	N	N	N	N
6	fair	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	N
10	—	N	N	N	N	N	N	N	N	N	N
11	—	N	—	—	N	N	N	N	N	N	N
12	fair	N	N	N	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda XL-125 Date 8/10/77 Temp. 82°F Barometer 29.20
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status Lean Carb + Catalyst + Air Odometer reading 691.2
Cold start? x Hot start? ____

Initial start: Time 3 sec; Cranks ____; Kicks 2; Choke ____; Other Choke to start
Second start: Time 3 sec; Cranks ____; Kicks 2; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	N	—	—	N	—	—	N	N	N	N
3	—	N	N	N	N	N	N	N	N	T	N
4	—	N	N	N	N	N	N	N	N	T	N
5	—	N	N	N	N	N	N	N	N	T	N
6	Good	N	—	—	N	—	—	N	N	T	N
7	—	—	—	—	N	—	—	N	N	T	N
9	—	N	—	—	N	T	—	N	N	M	N
10	Good	N	N	N	N	T	N	N	N	M	N
11	Good	N	—	—	N	N	N	N	N	M	N
12	Good	N	N	N	N	T	N	N	N	M	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: heat from catalyst on right leg

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda XL-125 Date 8/11/77 Temp. 93°F Barometer 29.20
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status Lean Carb + Catalyst + Air Odometer reading 701.1
Cold start? X Hot start?

Initial start: Time 2 sec; Cranks ; Kicks 1 ; Choke X ; Other Choke used 1 min for warm-up
Second start: Time 2 sec; Cranks ; Kicks 1 ; Choke ; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	N	—	—	N	—	—	N	N	N	T
3	—	N	N	T	N	T	T	N	N	N	N
4	—	N	N	T	N	N	T	N	N	N	N
5	—	N	N	N	N	N	N	N	N	T	N
6	Good	N	—	—	N	—	—	N	N	M	N
7	—	—	—	—	N	—	—	N	N	M	N
9	—	N	—	—	N	N	—	T	N	N	N
10	Good	N	N	T	N	N	N	N	N	N	N
11	Good	N	—	—	N	N	N	N	N	N	N
12	Good	N	N	N	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Extreme heat noted from catalyst on leg - no shield used

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki RE-5 Date 12-1-76 Temp. 49°F Barometer 29.49
Driver Jimbo Assisting Technician Ken
Motorcycle status Stock Odometer reading 1004.0
Cold start? X 74° Hot start?

Initial start: Time 4 sec; Cranks 1 ; Kicks ; Choke X ; Other choke for 30 seconds
Second start: Time 1 sec; Cranks 1 ; Kicks ; Choke ; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	GOOD	N	—	—	N	—	—	T	T	N	N
3	—	N	N	T	N	N	T	T	T	N	N
4	—	N	N	T	N	N	T	T	T	N	N
5	—	N	N	T	N	N	T	T	T	N	N
6	GOOD	N	—	—	N	—	—	T	T	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	T	T	N	N
10	GOOD	N	N	N	N	N	N	T	T	N	N
11	GOOD	N	—	—	N	N	N	M	T	N	N
12	GOOD	N	N	N	N	N	N	M	T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki RE-5 Date 1-10-77 Temp. 30°F Barometer 29.55
Driver Ken Assisting Technician Jimbo
Motorcycle status Stock Odometer reading 1029.7
Cold start? X 72° Hot start? ____

Initial start: Time 15 sec; Cranks 2 ; Kicks ____; Choke X ; Other choke for 30 sec.
Second start: Time 3 sec; Cranks 1 ; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	GOOD	N	—	—	N	—	—	N	N	N	N
3	—	N	N	N	N	N	N	N	N	N	N
4	—	N	N	N	N	N	N	N	N	N	N
5	—	N	N	N	N	N	N	N	N	N	N
6	GOOD	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	N
10	GOOD	N	N	N	N	N	N	N	T	N	N
11	GOOD	N	—	—	M	N	N	T	T	N	N
12	GOOD	N	N	N	N	N	N	T	T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki RE-5 Date 6-8-77 Temp. 95°F Barometer 29.02
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status Catalysts Odometer reading 1114.9
Cold start? ✓ Hot start? ____

Initial start: Time 3 sec; Cranks ____; Kicks ____; Choke ✓; Other choke for normal start-up
Second start: Time 2 sec; Cranks ____; Kicks ____; Choke n/a ; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Good	N	—	—	N	—	—	N	N	N	T
3	—	N	N	T	N	T	N	N	N	N	N
4	—	N	N	T	N	T	N	N	N	N	N
5	—	N	N	T	N	T	N	N	N	T	N
6	Good	N	—	—	N	—	—	N	N	T	N
7	—	—	—	—	N	—	—	N	N	T	N
9	—	N	—	—	N	N	—	N	N	M	N
10	Good	N	N	N	N	T	N	T	N	T	N
11	Good	N	—	—	N	T	T	T	N	T	N
12	Good	N	N	T	N	T	N	T	T	T	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: trace vibration and noise from engine
heat noted from catalyst

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki RE-5 Date 6/20/77 Temp. 95°F Barometer 29.21
Driver Jimbo Boylan Assisting Technician Ken Norman
Motorcycle status Catalyst, Air pump Odometer reading 1126.0
Cold start? ✓ Hot start? ____

Initial start: Time 3 sec; Cranks ____; Kicks ____; Choke ✓; Other choke for normal start-up
Second start: Time 2 sec; Cranks ____; Kicks ____; Choke ---; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Good	N	—	—	N	—	—	N	N	N	T
3	—	N	T	T	N	N	T	N	N	N	N
4	—	N	T	T	N	N	T	N	N	N	N
5	—	N	N	N	N	N	T	N	N	N	N
6	Good	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	T	N
9	—	N	—	—	N	N	—	N	Pump T	N	N
10	Good	N	T	T	N	N	T	N	Pump T	N	N
11	Good	N	—	—	N	N	N	N	N	N	N
12	Good	N	N	T	N	N	T	Pump T	Pump T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki RE-5 Date 6/23/77 Temp. 76°F Barometer 29.12
Driver Ken Norman Assisting Technician Jimbo Boylan
Motorcycle status Catalysts, air pump Odometer reading 1136.2
Cold start? ✓ Hot start? ____

Initial start: Time 3 sec; Cranks ____; Kicks ____; Choke ✓; Other choke for normal start-up
Second start: Time 2 sec; Cranks ____; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Good	N	—	—	N	—	—	N	N	N	T
3	—	N	N	N	N	N	N	N	N	N	N
4	—	N	N	N	N	N	N	N	N	N	N
5	—	N	N	N	N	N	N	N	N	N	N
6	Good	N	—	—	N	—	—	N	N	T	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	T	N
10	Good	N	N	N	N	N	N	N	N	N	N
11	Good	N	—	—	N	N	N	N	N	N	N
12	Good	N	N	N	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle GL-1000 Honda Date 12-21-76 Temp. 49°F Barometer 29.49
Driver Ken Assisting Technician Jimbo
Motorcycle status Stock Odometer reading 988.2
Cold start? X 70° Hot start? ____

Initial start: Time 27 sec; Cranks 4 ; Kicks ____; Choke X ; Other choke to start - 10 sec.
Second start: Time 2 sec; Cranks 1 ; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	POOR	3	—	—	N	—	—	N	N	N	N
3	—	N	N	T	N	N	N	N	N	N	N
4	—	N	N	T	N	N	N	N	N	N	N
5	—	N	N	T	N	N	N	N	N	N	N
6	FAIR	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	N
10	GOOD	N	T	T	N	N	N	N	N	N	N
11	GOOD	N	—	—	N	N	N	N	N	N	N
12	GOOD	N	T	T	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda GL-1000 Date 1-07-77 Temp. 64°F Barometer 29.21
Driver Jimbo Assisting Technician Ken
Motorcycle status Stock Odometer reading 1018.4
Cold start? X 73°F Hot start? ____

Initial start: Time 2 sec; Cranks 1 ; Kicks ____; Choke X ; Other choke on for 20 sec.
Second start: Time 1 sec; Cranks 1 ; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	GOOD	N	—	—	N	—	—	N	N	N	N
3	—	N	N	M	N	N	M	N	N	N	N
4	—	N	N	M	N	N	M	N	N	N	N
5	—	N	N	M	N	N	M	N	N	N	N
6	GOOD	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	heat from cyl. on ankles T	N
10	GOOD	N	N	N	N	N	N	N	N	T	N
11	GOOD	N	—	—	N	N	N	N	N	T	N
12	GOOD	N	N	N	N	N	N	N	N	T	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda GL-1000 Date 6/6/77 Temp. 91°F Barometer 29.19
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status catalyst and air injection Odometer reading 1055.9
Cold start? ✓ Hot start? ____

Initial start: Time 3 sec; Cranks -- ; Kicks -- ; Choke x ; Other choke on 40 sec
Second start: Time 2 sec; Cranks -- ; Kicks — ; Choke -- ; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	poor	N	—	—	N	—	—	N	N	N	N
3	—	N	N	N	N	N	T	N	N	N	T
4	—	N	N	T	N	N	T	N	N	T	N
5	—	N	N	N	N	N	T	N	N	T	N
6		N	—	—	N	—	—	N	N	T	N
7	—	—	—	—	N	—	—	N	N	T	N
9	—	N	—	—	N	N	—	N	N	N	N
10	good	N	N	N	N	N	N	N	N	N	N
11	good	N	—	—	N	N	N	N	N	N	N
12	good	N	N	N	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Noise from pump; heat on ankles from catalyst

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Honda GL-1000 Date 6/8/77 Temp. 95°F Barometer 29.02
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status catalyst + air pump Odometer reading 1056.0
Cold start? ✓ Hot start? ____

Initial start: Time 4 sec; Cranks -- ; Kicks -- ; Choke x ; Other choke on 35 sec
Second start: Time 3 sec; Cranks -- ; Kicks -- ; Choke -- ; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	fair	N	—	—	N	—	—	N	T	N	N
3	—	N	T	T	N	T	N	N	N	N	N
4	—	N	N	T	N	N	N	N	T	N	N
5	—	N	N	T	N	N	N	N	T	N	N
6	good	N	—	—	N	—	—	N	T	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	T	N	N
10	good	N	N	T	N	N	N	N	T	N	N
11	good	N	—	—	N	N	N	N	T	N	N
12	good	N	N	T	N	N	N	N	T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Heat on feet and legs, heat from radiator and catalyst, noise from pump running

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Yamaha RD -400 Date 12-16-76 Temp. 69° Barometer 29.37
Driver Jimbo Assisting Technician Ken
Motorcycle status Stock Odometer reading 987.7
Cold start? X 76° Hot start? ____

Initial start: Time 5 sec; Cranks ____; Kicks 2 ; Choke X ; Other choke on for 13 sec.
Second start: Time 1 sec; Cranks ____; Kicks 1 ; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	POOR	1	—	—	N	—	—	N	M	N	M
3	—	1	N	N	N	N	N	N	M	N	M
4	—	N	N	N	N	N	N	T	M	N	M
5	—	N	N	N	N	N	N	T	M	N	M
6	POOR	1	—	—	N	—	—	T	T	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	T	N	N	T
10	POOR	N	N	N	N	N	N	T	T	N	T
11	POOR	N	—	—	N	N	N	N	T	N	T
12	POOR	N	N	N	N	N	N	N	T	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Yamaha RD-400 Date 12-20--76 Temp. 48°F Barometer 29.45
Driver Ken Assisting Technician Jimbo
Motorcycle status Stock Odometer reading 1005.3
Cold start? X 72° Hot start? ____

Initial start: Time 10 sec; Cranks ____; Kicks 5 ; Choke X ; Other choke on 20 sec.
Second start: Time 2 sec; Cranks ____; Kicks 1 ; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	POOR	1	—	—	N	—	—	T	T	N	M
3	—	N	N	N	N	N	N	N	T	N	T
4	—	N	N	N	N	N	N	N	N	N	T
5	—	1	N	N	N	N	N	N	N	N	T
6	FAIR	N	—	—	N	—	—	T	N	N	T
7	—	—	—	—	N	—	—	N	N	N	T
9	—	N	—	—	N	N	—	N	N	N	T
10	GOOD	N	N	N	N	N	N	N	N	N	T
11	GOOD	N	—	—	N	N	N	N	N	N	T
12	GOOD	N	N	N	N	N	N	N	N	N	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Yamaha RD-400 Date 3-16-77+3-17-77 Temp. 81 Barometer 29.15
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status Catalyst # 3002 + Air induction (Subaru) Odometer reading 1017.7
Cold start? X Hot start? ____

Initial start: Time 4 sec; Cranks ____; Kicks 2; Choke 5 sec; Other ____
Second start: Time 2 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	1	—	—	N	—	—	N	N	N	T
3	—	N	N	N	N	N	N	N	N	N	T
4	—	N	N	N	N	N	N	N	N	N	T
5	—	N	N	N	N	N	N	N	N	N	T
6	Good	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	N
10	Good	N	N	N	N	N	N	N	N	N	N
11	Good	N	—	—	N	N	N	T	N	N	N
12	Good	N	N	N	N	N	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Yamaha RD-400 Date 3-16-77+3-17-77 Temp. 87 Barometer 28.78
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status Cat. #3002+ Air Induction (Subaru) Odometer reading 1031.9
Cold start? ____ Hot start? X

Initial start: Time 2 sec; Cranks ____; Kicks 1; Choke ____; Other ____
Second start: Time 2 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Good	N	—	—	N	—	—	N	N	N	T
3	—	N	N	N	N	N	N	N	N	N	T
4	—	N	N	N	N	N	N	N	N	T	T
5	—	N	N	N	N	N	N	N	N	T	Odor T
6	Good	N	—	—	N	—	—	N	N	T	Odor T
7	—	—	—	—	N	—	—	N	N	T	Odor T
9	—	N	—	—	N	N	—	N	N	T	Odor T
10	Good	N	N	N	N	N	T	N	N	T	Odor T
11	Good	N	—	—	N	N	N	N	N	T	Odor T
12	Good	N	N	N	N	N	N	N	N	T	Odor T

W.O.T. accel made in 3rd gear
Trace of heat on ankles from catalyst
Odor is from catalyst

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Yamaha RD-400 Date 7/12/77 Temp. 94°F Barometer 29.21
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status Thermal Reactors Odometer reading 1109.6
Cold start? x Hot start?

Initial start: Time 2 sec; Cranks ; Kicks 1 ; Choke x ; Other Choke to start
Second start: Time 2 sec; Cranks ; Kicks 1 ; Choke ; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Good	N	—	—	N	—	—	N	N	N	M
3	—	N	N	T	N	N	T	N	N	N	M
4	—	N	T	T	N	T	T	N	N	N	M
5	—	N	T	T	N	T	T	N	N	N	M
6	Good	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	T
10	Good	N	T	M	N	T	M	N	N	N	M
11	Good	N	—	—	N	N	N	N	N	N	T
12	Good	N	N	H	N	M	H	N	N	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: motorcycle accelerates slow and performance seems sluggish

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Yamaha RD-400 Date 7/13/77 Temp. 95°F Barometer 29.29
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status Thermal Reactors Odometer reading 1098.8
Cold start? x Hot start?

Initial start: Time 3 sec; Cranks ; Kicks 1 ; Choke ; Other Choke to start
Second start: Time 2 sec; Cranks ; Kicks 1 ; Choke - ; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	N	—	—	N	—	—	N	N	N	M
3	—	N	N	N	N	N	N	N	N	N	M
4	—	N	N	N	N	N	N	N	N	N	M
5	—	N	N	N	N	N	N	N	N	N	M
6	Good	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	M	—	N	N	N	M
10	Good	N	M	N	N	H	M	N	N	N	M
11	Good	N	—	—	N	N	N	N	N	N	T
12	Good	N	H	N	N	H	M	N	N	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Significant reduction in power noted during acceleration

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KH 500 Date 12-20-76 Temp. 48°F Barometer 29.45
Driver Ken Assisting Technician Jimbo
Motorcycle status Stock Odometer reading 990.0
Cold start? 70°F Hot start? ____

Initial start: Time 30 sec; Cranks ____; Kicks 15; Choke X; Other choke for 10 sec.
Second start: Time 2 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	FAIR	N	—	—	—	—	—	T	T	---	T
3	—	N	N	N	N	T	N	T	T	N	M
4	—	N	T	T	N	T	N	T	T	N	M
5	—	N	T	T	N	T	N	T	T	N	M
6	FAIR		—	—	N	—	—	T	T	N	M
7	—	—	—	—	N	—	—	T	N	N	T
9	—	N	—	—	N	T	—	T	T	N	T
10	GOOD	N	T	T	N	T	T	T	T	N	H
11	GOOD	N	—	—	N	N	N	T	T	N	M
12	GOOD	N	M	T	N	T	T	T	T	N	H

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KH 500 Date 12-21-76 Temp. 47°F Barometer 29.45
Driver JIMBO Assisting Technician KEN
Motorcycle status Stock Odometer reading 1005.0
Cold start? 70°F Hot start? ____

Initial start: Time 25 sec; Cranks ____; Kicks 10; Choke X; Other choke for 35 sec.
Second start: Time 2 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	GOOD	N	—	—	N	—	—	N	N	N	T
3	—	N	N	N	N	N	N	T	T	N	M
4	—	N	N	N	N	N	N	T	T	N	M
5	—	N	N	N	N	N	N	T	T	N	M
6	GOOD	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	T	T	N	M
10	GOOD	N	N	T	N	N	M	T	T	N	M
11	GOOD	N	—	—	N	N	N	T	T	N	M
12	GOOD	N	N	N	N	N	N	T	T	N	H

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KH-500 Date 4/27/77 Temp. 84°F Barometer 29.26
Driver Kenneth Norman Assisting Technician Jim Boylan
Motorcycle status Port liners + catalyst PTX 314 Odometer reading 1140.1
Cold start? X Hot start? ___

Initial start: Time 3 sec; Cranks ___; Kicks 1; Choke 30 sec; Other ___
Second start: Time 3 sec; Cranks ___; Kicks ___; Choke ___; Other ___

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	N	—	—	N	—	—	N	N	N	M
3	—	N	M	N	N	M	T	N	N	N	T
4	—	N	T	N	N	T	T	N	N	N	T
5	—	N	T	N	N	T	T	N	N	N	T
6	Good	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	T	—	N	N	N	T
10	Good	N	M	N	N	T	T	N	N	N	T
11	Good	N	—	—	N	N	N	T	T	N	T
12	Good	N	H	N	N	M	M	T	N	N	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: plates on top of catalyst vibrate; motorcycle has lost some power since catalyst has been installed

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KH-500 Date 4/28/77 Temp. 81°F Barometer 29.24
Driver Jim Boylan Assisting Technician Kenneth Norman
Motorcycle status Port liners + catalyst PTX 314 Odometer reading 1152.6
Cold start? X Hot start? ___

Initial start: Time 2 sec; Cranks 1; Kicks 1; Choke X; Other choke on 10 sec.
Second start: Time 2 sec; Cranks ___; Kicks ___; Choke ___; Other ___

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Good	N	—	—	N	—	—	N	N	N	right cyl. mod
3	—	N	N	N	N	N	N	N	N	N	right mod.
4	—	N	N	N	N	N	N	N	N	N	T
5	—	N	N	N	N	N	N	N	N	N	T
6	Good	N	—	—	N	—	—	N	N	T	T
7	—	—	—	—	N	—	—	N	N	T	N
9	—	N	—	—	N	N	—	N	N	M	T
10	Good	N	N	MODERATE	N	N	MODERATE	N	N	M	T
11	Good	N	—	—	N	N	N	N	N	M	All mod
12	Good	N	N	TRACE	N	N	TRACE	N	N	M	All mod

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Heat from catalyst on ankles
# 10, motorcycle did not perform as well as it used to, did not have as much power in this mode
# 12, motorcycle acceleration good but not as well as before

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KH-500 Date 5/18/77 Temp. 75°F Barometer 29.16
Driver Ken Norman Assisting Technician Clay Suhler
Motorcycle status catalyst + lean carbs + port liners Odometer reading 1199.1
Cold start? ✓ Hot start? ______

Initial start: Time 6 sec; Cranks -- ; Kicks 3 ; Choke X ; Other choke used 60 sec
Second start: Time 3 sec; Cranks -- ; Kicks 1 ; Choke -- ; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	poor	2	—	—	N	—	—	N	N	N	M
3	—	N	H	T	N	H	M	N	N	N	M
4	—	N	H	T	N	H	M	N	N	N	M
5	—	N	M	N	N	M	M	N	N	N	T
6	fair	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	M	—	N	N	N	N
10	good	N	T	N	N	M	M	N	N	N	N
11	good	N	—	—	N	N	N	N	N	N	N
12	good	N	H	N	N	H	M	N	N	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KH-500 Date 5/19/77 Temp. 83°F Barometer 29.11
Driver Clay Suhler Assisting Technician Ken Norman
Motorcycle status catalyst lean carbs + port liners Odometer reading 1210.4
Cold start? ✓ Hot start? ______

Initial start: Time 10 sec; Cranks -- ; Kicks 4 ; Choke X ; Other choke used 15 sec
Second start: Time 5 sec; Cranks -- ; Kicks 1 ; Choke -- ; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	good	N	—	—	N	—	—	N	N	N	N
3	—	N	H	H	N	N	H	N	N	N	N
4	—	N	M	M	N	T	H	N	N	N	T
5	—	N	M	M	N	N	M	N	N	N	T
6	good	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	M	—	N	N	N	T
10	good	N	N	M	N	N	M	N	N	N	M
11	----	N	—	—	N	N	N	N	N	N	N
12	good	N	N	N	N	N	T	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KH-500 Date 6/20/77 Temp. 95°F Barometer 29.21
Driver Ken Norman Assisting Technician Jimbo Boylan
Motorcycle status New Catalyst + Port Liners Odometer reading 1550.3
Cold start? ✓ Hot start? ____

Initial start: Time 13 sec; Cranks ____; Kicks 4 ; Choke ✓ ; Other choke used for 30 sec
Second start: Time 5 sec; Cranks ____; Kicks 2 ; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	1	—	—	N	—	—	N	N	N	M
3	—	1	T	T	N	T	T	N	N	N	M
4	—	N	M	N	N	M	T	N	N	N	M
5	—	N	T	N	N	T	T	N	N	N	M
6	Fair	1	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	M	—	T	N	T	T
10	Fair	N	M	T	N	M	M	N	N	N	M
11	Fair	N	—	—	N	N	N	T	N	N	T
12	Fair	N	H	T	N	H	M	N	N	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KH-500 Date 6/23/77 Temp. 76°F Barometer 29.12
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status catalyst + port liners + lean Odometer reading 1566.3
Cold start? ✓ Hot start? ____

Initial start: Time 30 sec; Cranks ____; Kicks 20 ; Choke ✓ ; Other choke for start
Second start: Time 5 sec; Cranks ____; Kicks 3 ; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	poor	2	—	—	N	—	—	N	N	N	M
3	—	N	M	H	N	M	H	N	N	N	T
4	—	N	M	H	N	M	H	N	N	N	T
5	—	N	T	M	N	T	M	N	N	N	T
6	fair	N	—	—	N	—	—	N	N	T	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	M	T
10	good	N	T	T	N	T	T	N	N	T	T
11	good	N	—	—	N	N	N	N	N	T	N
12	good	N	N	T	N	N	T	N	N	T	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Performance impro es as rpm is increased heat from catalyst

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KH-500 Date 7/1/77 Temp. 94°F Barometer 29.25
Driver Jim Boylan Assisting Technician Rick Emmert
Motorcycle status catalyst + port liners + lean + air Odometer reading 1575.7
Cold start? ✓ Hot start? ____

Initial start: Time 3 sec; Cranks ____; Kicks ____; Choke ✓; Other choke for start
Second start: Time 3 sec; Cranks ____; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	poor	N	—	—	N	—	—	N	N	N	H
3	—	N	T	T	N	T	N	N	N	N	N
4	—	N	T	T	N	T	T	N	N	N	M
5	—	N	T	N	N	T	T	N	N	T	T
6	fair	N	—	—	N	—	—	N	N	T	T
7	—	—	—	—	N	—	—	N	N	T	N
9	—	N	—	—	N	T	—	N	N	H	T
10	good	N	H	H	N	N	M	N	N	M	M
11	good	N	—	—	N	N	N	N	N	M	T
12	good	N	T	T	N	T	T	N	N	M	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Heat noted from catalyst on ankles performance seemed to drop as operating temperature increased
Mode 10 (W.O.T. acceleration to 50 mph) ran rough - improved at half throttle).

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KH-500 Date 7/5/77 Temp. 91°F Barometer 29.23
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status catalyst + port liners + lean + air Odometer reading 1591.5
Cold start? ✓ Hot start? ____

Initial start: Time 5 sec; Cranks ____; Kicks 2; Choke ____; Other choke to start
Second start: Time 2 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	fair	1	—	—	N	—	—	N	N	N	M
3	—	N	H	H	N	H	H	N	N	N	T
4	—	N	M	M	N	M	M	N	N	N	T
5	—	N	M	T	N	M	M	N	N	N	T
6	good	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	M	—	N	N	N	T
10	good	N	H	T	N	H	H	N	N	N	T
11	good	N	—	—	N	N	N	N	N	M	T
12	good	N	T	N	N	M	T	N	N	N	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KE 175 Date 12-16-76 Temp. 69° Barometer 29.37
Driver Tom Assisting Technician Ken
Motorcycle status Stock Odometer reading 981.8
Cold start? X 75°F Hot start? ____

Initial start: Time 1 sec; Cranks ____; Kicks 1; Choke X; Other choke for 10 sec.
Second start: Time 1 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	B vibration	noise	A heat	smoke or odor
2	GOOD	N	—	—	N	—	—	M	M	T	T
3	—	N	N	N	N	N	N	M	M	T	T
4	—	N	N	N	N	N	N	M	M	T	T
5	—	N	N	N	N	N	N	M	M	T	T
6	GOOD	N	—	—	N	—	—	M	M	T	T
7	—	—	—	—	N	—	—	M	M	T	T
9	—	N	—	—	N	N	—	M	M	T	T
10	GOOD	N	N	N	N	N	N	M	M	T	T
11	GOOD	N	—	—	N	N	N	M	M	T	T
12	GOOD	N	N	N	N	N	N	M	M	T	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

A - exhaust pipe routed by leg
B - does not include vibration from tires

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KE 175 Date 12-20-76 Temp. 52°F Barometer 29.46
Driver Jimbo Assisting Technician Ken
Motorcycle status Stock Odometer reading ____
Cold start? X 72°F Hot start? ____

Initial start: Time 5 sec; Cranks ____; Kicks ____; Choke x; Other choke on for 15 sec.
Second start: Time 1 sec; Cranks ____; Kicks ____, Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	GOOD	N	—	—	N	—	—	T	N	N	T
3	—	N	T	N	N	N	N	T	T	N	T
4	—	N	T	N	N	N	T	T	T	N	T
5	—	N	N	N	N	N	N	T	T	N	T
6	GOOD	N	—	—	N	—	—	T	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	T	T	N	T
10	GOOD	N	N	T	N	N	N	T	T	N	T
11	GOOD	N	—	—	N	N	N	M	N	N	T
12	GOOD	N	N	N	N	N	N	T	M	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KE 175 Date 4/8/77 Temp. 84° Barometer 29.40
Driver Jim Boylan Assisting Technician Kenneth Norman
Motorcycle status Rotary valve 20° added Odometer reading 1081.3
Cold start? x Hot start? ____

Initial start: Time 3 sec; Cranks ____; Kicks 4; Choke x; Other choke on for 15 sec.
Second start: Time 1 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	1	—	—	N	—	—	T	N	N	H
3	—	N	N	T	N	N	T	T	N	N	H
4	—	N	N	T	N	N	T	T	N	N	H
5	—	N	N	T	N	N	T	T	N	N	M
6	Good	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	M	N	T	M
10	Good	N	N	N	N	N	N	T	N	T	H
11	Good	N	—	—	N	N	N	M	N	T	M
12	Good	N	N	N	N	N	T	H	N	T	H

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: heat on right thigh; engine vibration noted, stretchiness noted at higher speeds

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KE-175 Date 4/25/77 Temp. 76°F Barometer 29.28
Driver Kenneth Norman Assisting Technician ____
Motorcycle status Rotary valve IC 10° before stock Odometer reading 1092.0
Cold start? x Hot start? ____

Initial start: Time 5 sec; Cranks ____; Kicks 2; Choke x; Other choke used 30 sec.
Second start: Time 1 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	1	—	—	N	—	—	N	N	N	H
3	—	N	M	N	N	T	M	N	N	N	H
4	—	N	T	N	N	T	M	T	N	N	M
5	—	N	N	N	N	N	N	T	N	N	M
6	Good	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	M	N	N	T
10	Good	N	N	N	N	N	N	T	N	N	M
11	Good	N	—	—	N	N	N	T	N	N	T
12	Good	N	N	N	N	N	N	M	N	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KE-175 Date 5/17/77 Temp. 76°F Barometer 29.17
Driver Clay Suhler Assisting Technician Ken Norman
Motorcycle status lean carb + stock rotary valve Odometer reading 1107.9
Cold start? ✓ Hot start? ____

Initial start: Time 60 sec; Cranks ____; Kicks 6 ; Choke x ; Other choke used 60 sec
Second start: Time 5 sec; Cranks ____; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	poor	5	—	—	N	—	—	M	N	N	M
3	—	N	N	N	N	N	M	T	N	N	T
4	—	N	N	N	N	N	N	N	N	N	T
5	—	N	N	N	N	N	N	N	N	N	T
6	fair	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	T
10	—	N	N	N	N	N	N	N	N	N	M
11	—	N	—	—	N	N	N	N	N	N	N
12	good	N	N	N	N	N	N	N	N	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KE-175 Date 5/19/77 Temp. 83°F Barometer 29.11
Driver Ken Norman Assisting Technician Clay Suhler
Motorcycle status lean carb + stock rotary valve Odometer reading 1137.5
Cold start? ✓ Hot start? ____

Initial start: Time 5 sec; Cranks -- ; Kicks 2 ; Choke -- ; Other choke used 10 sec
Second start: Time 3 sec; Cranks -- ; Kicks 1 ; Choke -- ; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	poor	N	—	—	N	—	—	N	N	N	M
3	—	N	T	N	N	T	T	N	N	N	M
4	—	N	N	N	N	T	N	N	N	N	T
5	—	N	N	N	N	N	N	N	N	N	T
6	fair	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	M
10	good	N	N	N	N	N	N	N	N	N	M
11	good	N	—	—	N	N	N	N	N	N	N
12	good	N	N	N	N	N	N	N	N	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KE-175 Date 7-5-77 Temp. 91°F Barometer 29.23
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status Lean + 1/2 Catalyst + Air 0533 Odometer reading 1153.5
Cold start? X Hot start? ____

Initial start: Time 5 sec; Cranks ____; Kicks 2; Choke ____; Other Choke to start
Second start: Time 2 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	N	—	—	N	—	—	N	N	N	M
3	—	N	N	M	N	N	M	N	N	T	T
4	—	N	N	M	N	N	M	N	N	T	T
5	—	N	N	T	N	N	T	N	N	M	T
6	Good	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	T	—	T	M	H	N
10	Good	N	T	T	N	N	T	N	N	H	N
11	Good	N	—	—	N	N	N	N	N	H	N
12	Good	N	N	T	N	N	T	T	T	H	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Vibration + noise caused by heat shield on catalyst
Heat from catalyst

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KE-175 Date 7/6/77 Temp. 84°F Barometer 29.28
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status Lean + 1/2 Catalyst + Air 0533 Odometer reading 1170.1
Cold start? X Hot start? ____

Initial start: Time 7 sec; Cranks ____; Kicks 4; Choke ____; Other Choke to start
Second start: Time 2 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	1	—	—	N	—	—	N	N	N	M
3	—	N	T	T	N	N	N	N	T	N	M
4	—	N	N	N	N	N	N	N	T	N	M
5	—	N	N	N	N	N	N	N	N	N	T
6	Good	N	—	—	N	—	—	N	N	T	N
7	—	—	—	—	N	—	—	N	N	T	N
9	—	N	—	—	N	T	—	T	T	N	N
10	Good	N	M	T	N	M	T	N	T	N	N
11	Good	N	—	—	N	N	N	T	T	T	N
12	Good	N	M	T	N	H	T	N	T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: engine had pinging noise

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Kawasaki KE-175 Date 7/27/77 Temp. 83°F Barometer 29.25
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status Lean + 1/2 Catalyst + Air 1033 Odometer reading 1186.3
Cold start? X Hot start? ____

Initial start: Time 5 sec; Cranks ____; Kicks 2; Choke ____; Other Choke to start
Second start: Time 3 sec; Cranks ____; Kicks 2; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	N	—	—	N	—	—	T	T	M	T
3	—	N	N	N	N	N	N	T	T	T	M
4	—	N	T	T	N	N	T	T	T	M	M
5	—	N	T	T	N	N	T	T	T	M	M
6	Good	N	—	—	N	—	—	T	T	H	T
7	—	—	—	—	N	—	—	N	N	H	N
9	—	N	—	—	N	N	—	M	T	H	T
10	Good	N	T	T	N	N	T	T	T	H	T
11	Good	N	—	—	N	N	N	T	T	H	T
12	Good	N	N	N	N	N	T	T	T	H	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: Vibration and noise noted from catalyst shield
Heat from catalyst

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle TS-100 Date 12-16-76 Temp. 76 Barometer 29.38
Driver Tom Assisting Technician ____
Motorcycle status Stock Odometer reading 954.8 - 957.1
Cold start? X Hot start? ____

Initial start: Time 2 sec; Cranks ____; Kicks 1; Choke X; Other choke for start
Second start: Time 1 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	GOOD	N	—	—	N	—	—	M	M	N	M
3	—	N	N	N	N	N	N	M	M	N	M
4	—	N	N	N	N	N	N	M	M	N	M
5	—	N	N	N	N	N	N	M	M	N	M
6	GOOD	N	—	—	N	—	—	M	M	N	M
7	—	—	—	—	N	—	—	M	M	N	M
9	—	N	—	—	N	N	—	M	M	N	M
10	GOOD	N	N	N	N	N	N	M	M	N	M
11	GOOD	N	—	—	N	N	N	M	M	N	M
12	GOOD	N	N	N	N	N	N	M	M	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki TS 100 Date 1-10-77 Temp. 30 Barometer 29.55
Driver Jimbo Assisting Technician Ken
Motorcycle status Stock Odometer reading 979.9
Cold start? 72° Hot start? ____

Initial start: Time 10 sec; Cranks ____; Kicks 15; Choke X; Other choke for 15 sec.
Second start: Time 1 sec; Cranks ____; Kicks 1; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	GOOD	N	—	—	N	—	—	T	T	N	H
3	—	N	N	N	N	N	N	T	T	N	M
4	—	N	N	N	N	N	T	M	T	N	T
5	—	N	N	N	N	N	T	M	T	N	T
6	GOOD	N	—	—	N	—	—	T	T	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	T
10	GOOD	N	N	N	N	N	T	M	T	N	T
11	GOOD	N	—	—	N	N	N	T	N	N	T
12	GOOD	N	N	N	N	N	T	M	M	N	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki TS-100 Date 6/1/77 Temp. 80°F Barometer 29.20
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status rotary valve modification, 10° advance IC Odometer reading 1079.8
Cold start? ✓ Hot start? ____

Initial start: Time 4 sec; Cranks --, Kicks 2; Choke X; Other choke for 20 sec
Second start: Time 1 sec; Cranks --; Kicks 1; Choke --; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	fair	N	—	—	N	—	—	N	N	N	M
3	—	N	T	N	N	T	T	N	N	N	M
4	—	N	T	N	N	T	T	N	N	N	M
5	—	N	N	N	N	T	N	N	N	N	M
6	good	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	T	—	N	N	N	M
10	good	N	T	N	N	M	M	N	N	N	M
11	good	N	—	—	N	N	N	N	N	N	M
12	good	N	M	M	N	M	M	N	N	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: No. 12 misses and loses power at WOT, begins to accelerate again just below WOT

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki TS 100 Date 6/11/77 Temp. 90°F Barometer 29.09
Driver Jimbo Boylan Assisting Technician Ken Norman
Motorcycle status Lean Carb, CDI Ignition Odometer reading 1112.7
Cold start? ✓ Hot start? ____

Initial start: Time 5 sec; Cranks ____; Kicks ____; Choke ✓; Other choke used for 30 sec.
Second start: Time 2 sec; Cranks ____; Kicks ____; Choke n/a; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	1	—	—	N	—	—	N	N	N	M
3	—	N	N	M	N	N	M	N	N	N	M
4	—	N	N	T	N	N	T	N	N	N	M
5	—	N	N	T	N	N	T	N	N	N	M
6	Good	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	T	N	N	M
10	Good	N	N	N	N	N	N	N	N	N	H
11	Good	N	—	—	N	N	N	N	N	N	T
12	Good	N	N	N	N	N	T	M	N	N	H

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki TS-100 Date 6/13/77 Temp. 100°F Barometer 29.16
Driver Ken Norman Assisting Technician Jimbo Boylan
Motorcycle status CDI & Lean Carb. Odometer reading 1125.5
Cold start? ✓ Hot start? ____

Initial start: Time 10 sec; Cranks ____; Kicks 4; Choke ✓; Other Choke used intermittently for 45 sec.
Second start: Time 3 sec; Cranks ____; Kicks 2; Choke --; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Poor	1	—	—	N	—	—	N	N	N	M
3	—	N	H	H	N	H	H	N	N	N	M
4	—	N	M	T	N	H	M	N	N	N	M
5	—	N	T	N	N	T	T	N	N	N	M
6	Fair	N	—	—	N	—	—	N	N	N	M
7	—	—	—	—	N	—	—	N	N	N	M
9	—	N	—	—	N	T	—	N	N	N	M
10	Good	N	T	N	N	T	T	N	N	N	M
11	Good	N	—	—	N	N	N	N	N	N	M
12	Good	N	T	N	N	T	T	N	N	N	M

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki TS-100 Date 8/30/77 Temp. 95° Barometer 29.06
Driver Ken Assisting Technician Jim Boylan
Motorcycle status Lean + CDI + Catalyst + Air Odometer reading 1137.9
Cold start? X Hot start? ____

Initial start: Time 3 sec; Cranks ____; Kicks 3 ; Choke X ; Other Choke - 15 sec.
Second start: Time 1 sec; Cranks ____; Kicks 1 ; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	POOR	1	—	—	N	—	—	T	M	N	H
3	—	N	H	M	N	M	M	T	M	N	H
4	—	N	M	T	N	M	T	T	M	N	M
5	—	N	T	T	N	M	T	T	M	N	T
6	GOOD	N	—	—	N	—	—	T	M	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	M	—	T	M	T	T
10	GOOD	N	H	N	N	M	T	T	M	N	T
11	GOOD	N	—	—	N	M	T	T	M	N	T
12	GOOD	N	M	N	N	M	T	T	M	N	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

NOTE: Vibration and noise from pump

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki TS-100 Date 8/31/77 Temp. 88° Barometer 29.07
Driver Jim Boylan Assisting Technician Ken
Motorcycle status Lean + CDI + Catalyst + Air Odometer reading 1150.0
Cold start? X Hot start? ____

Initial start: Time 3 sec; Cranks ____; Kicks 3 ; Choke X ; Other Choke - 30 sec.
Second start: Time 1 sec; Cranks ____; Kicks 1 ; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	POOR	N	—	—	N	—	—	T	T	N	T
3	—	N	H	H	N	H	H	T	T	N	M
4	—	N	M	M	N	M	M	T	T	N	M
5	—	N	T	T	N	T	T	T	T	N	T
6	GOOD	N	—	—	N	—	—	T	T	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	T	M	N	N
10	GOOD	N	N	N	N	N	N	T	M	N	T
11	GOOD	N	—	—	N	N	N	T	M	N	N
12	GOOD	N	T	T	N	N	T	T	M	N	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

NOTE: Vibration and noise from pump
WOT unacceptable, 3/4 throttle OK

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki GT 750 Date 12-16-76 Temp. 69° Barometer 29.38
Driver Ken Assisting Technician Jimbo
Motorcycle status Stock Odometer reading 943.2
Cold start? 76°F Hot start? ______

Initial start: Time 10 sec; Cranks 2 ; Kicks ____; Choke X ; Other choke for start and sec. warm up
Second start: Time 2 sec; Cranks 1 ; Kicks ____; Choke ____; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	GOOD	N	—	—	N	—	—	M	M	N	M
3	—	N	N	N	N	M	N	M	T	N	M
4	—	N	N	N	N	M	N	M	T	N	M
5	—	N	N	N	N	M	N	M	T	N	M
6	GOOD	N	—	—	N	—	—	M	T	N	M
7	—	—	—	—	N	—	—	M	T	N	N
9	—	N	—	—	N	N	—	M	T	N	N
10	GOOD	N	M	N	N	T	N	M	T	N	N
11	FAIR	N	—	—	N	N	N	N	T	N	N
12	FAIR	N	N	N	N	N	N	N	T	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle SUZUKI GT 750 Date 12-20-76 Temp. 48° Barometer 29.45
Driver Jimbo Assisting Technician Ken
Motorcycle status Stock Odometer reading 957.1
Cold start? X 70°F Hot start? ______

Initial start: Time 2 sec; Cranks 1 ; Kicks ____; Choke X ; Other choke for start only
Second start: Time 2 sec; Cranks 1 ; Kicks ____; Choke ____; Other ______

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	GOOD	N	—	—	N	—	—	N	N	N	T
3	—	N	N	N	N	N	N	T	N	N	T
4	—	N	T	N	N	N	N	T	N	N	T
5	—	N	T	N	N	N	N	T	N	N	T
6	GOOD	N	—	—	N	—	—	N	N	N	T
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	T	N	N	N
10	GOOD	N	N	N	N	N	T	T	T	N	T
11	GOOD	N	—	—	N	N	N	T	T	N	N
12	GOOD	N	N	N	N	N	N	N	T	N	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki GT 750 Date 2-8-77 Temp. 62° Barometer 29.00
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status 1st step control, lean carb.s + CDI Odometer reading 1050.5
Cold start? X 72° Hot start? ____

Initial start: Time 5 sec; Cranks 3 sec; Kicks ____; Choke X; Other Choke to start only, 10 sec
Second start: Time 2 sec; Cranks 2 sec; Kicks ____; Choke ---; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Good	N			N			N	N	N	T
3		N	N	N	N	N	T	N	N	N	N
4		N	N	N	N	N	N	N	N	N	T
5		N	N	N	N	N	N	N	N	N	T
6	Good	N			N			N	N	N	T
7					N			N	N	N	N
9		N			N	N		N	N	N	T
10	Good	N	T	N	N	T	N	T	N	N	T
11	Good	N			N	N	N	T	N	T	T
12	Good	N	T	N	N	T	N	T	N	T	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki GT 750 Date 2-11-77 Temp. 72° Barometer 29.20
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status 1st step control, lean carb.s + CDI Odometer reading 1065.8
Cold start? X 76° Hot start? ____

Initial start: Time 6 sec; Cranks 2; Kicks ____; Choke X; Other choke for start only
Second start: Time 2 sec; Cranks 1; Kicks ____; Choke ____; Other ____

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Good	N			N			N	N	N	M
3		N	N	T	N	N	N	T	N	N	T
4		N	N	T	N	N	N	T	N	N	T
5		N	N	N	N	N	N	T	N	N	T
6	Good	N			N			N	N	N	T
7					N			N	N	N	T
9		N			N	N		T	N	N	T
10	Good	N	N	M	N	N	M	T	N	N	T
11	Good	N			N	N	N	T	N	N	T
12	Good	N	N	N	N	N	N	T	T	N	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki GT-750 Date 8/1/77 Temp. 83°F Barometer 29.27
Driver Jim Boylan Assisting Technician Ken Norman
Motorcycle status CDI + Lean Carb. + Catalyst + Air Odometer reading 1170.1
Cold start? x Hot start?

Initial start: Time 5 sec; Cranks ; Kicks ; Choke x ; Other Choke used for start
Second start: Time 2 sec; Cranks ; Kicks ; Choke ; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	N	—	—	N	—	—	N	N	N	M
3	—	N	N	T	N	N	T	T	T	N	T
4	—	N	T	T	N	T	T	T	T	N	T
5	—	N	N	T	N	N	N	T	T	T	T
6	Good	N	—	—	N	—	—	N	N	M	T
7	—	—	—	—	N	—	—	N	N	M	N
9	—	N	—	—	N	T	—	T	T	H	T
10	Good	N	T	T	N	N	T	T	T	H	T
11	Good	N	—	—	N	N	N	T	T	M	T
12	Good	N	N	T	N	N	T	T	T	M	T

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

Note: vibration and noise caused by insecure exhaust pipes following catalyst addition

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MOTORCYCLE DRIVEABILITY EVALUATION FORM

Motorcycle Suzuki GT-750 Date 8/3/77 Temp. 95°F Barometer 29.07
Driver Ken Norman Assisting Technician Jim Boylan
Motorcycle status CDI + Lean Carb. + Catalyst + Air Odometer reading 1183.1
Cold start? X Hot start?

Initial start: Time 4 sec; Cranks ; Kicks ; Choke X ; Other Choke used for start
Second start: Time 2 sec; Cranks ; Kicks ; Choke - ; Other

Mode	idle quality	stall	stumble	hesitation	backfire	surge	stretchiness	vibration	noise	heat	smoke or odor
2	Fair	N	—	—	N	—	—	T	N	N	T
3	—	N	T	N	N	N	T	N	N	N	T
4	—	N	N	N	N	N	N	N	N	N	T
5	—	N	N	N	N	N	N	N	N	N	N
6	Good	N	—	—	N	—	—	N	N	N	N
7	—	—	—	—	N	—	—	N	N	N	N
9	—	N	—	—	N	N	—	N	N	N	N
10	Good	N	N	N	N	N	N	N	N	N	N
11	Good	N	—	—	N	N	N	N	N	N	N
12	Good	N	T	N	N	T	N	N	N	N	N

RATINGS - idle quality: good, fair, or poor
- stall: number of times stall occurred in mode
- others: none, or use rating severity scale as defined (trace, moderate, heavy)
- vibration, noise, heat, smoke or odor: indicate source and character

APPENDIX C

INFLUENCE OF VALVE OVERLAP ON HYDROCARBON EMISSION

At the request of the Project Officer, a brief investigation was conducted into the effects of valve timing (notably overlap) on hydrocarbon emissions from 4-stroke engines. One reference was found which touches on the subject, the salient portions of it have been copied and appear in this Appendix. Although the analysis of the data in this reference is useful, it does not really point out that the phenomenon shown in Figure 16 probably resulted from misfire. Decrease in overlap probably decreased charge dilution, permitting reliable ignition at leaner fuel-air ratios.

Existing valve timing was determined for three of the four reciprocating 4-stroke engine equipped test bikes, and it is tabulated below with overlap and with HC baseline emissions. Normal overlap schedules for automobile engines are 20° to 30°. It appears from these very limited data that overlap in itself does not have a very strong effect on HC emissions based on reductions in HC from FTPs to FETs as a function of overlap. If overlap had a very strong effect, it would be expected that a larger percentage difference in HC would occur when comparing FTP and FET emissions for a bike with high overlap. Percentage differences for the below three bikes are almost equal, however. FET hydrocarbons were 25.6 percent of FTP hydrocarbons for the KZ-900, compared to 23.0 percent for the GL-1000 and 27.9 percent for the CB-360T. It appears that this overlap variable, taken alone, would not make a useful modification for use in this program due to doubt about the significance of its effect.

Motorcycle	Intake Valve Timing		Exhaust Valve Timing		°Overlap	HC, g/km	
	Opens, °BTDC	Closes, °ABDC	Opens, °BBDC	Closes, °ATDC		FTP	FET
Kawasaki KZ-900	30	70	70	30	60	3.28	0.84
Honda GL-1000	5	50	50	5	10	2.78	0.64
Honda CB-360T	5	40	40	5	10	2.58	0.72

at a constant air-fuel ratio, the direct application of spark retarding to vehicle operation can produce different results. The increased throttle opening required with retarded spark increases the intake manifold pressure which, when it reaches a certain value, opens the carburetor power valve, supplying a richer fuel-air mixture to the engine. This richer mixture would increase carbon monoxide concentrations.

EXHAUST BACK PRESSURE

Engine C, a 352 C.I.D. V-8, was used to investigate the effect of increasing exhaust back pressure on hydrocarbon and carbon monoxide concentrations. This engine was tested at constant air-fuel ratios and spark settings at the following conditions: 1500 rpm at a constant, 25% full-throttle setting to give 20 OBHP at 0 in. Hg back pressure, and at 2500 rpm with constant 25, 75, and 100% full-throttle settings to give 34, 96, and 132 OBHP, respectively, at 0 in. Hg back pressure.

Fig. 14 shows that a restriction in the tailpipe to increase the exhaust back pressure to 8 in. Hg above atmospheric pressure had little effect on hydrocarbon concentrations. Engine power however was reduced with increasing back pressure at all test conditions. A maximum power loss of 6% occurred from 0 to 7.8 in. Hg back pressure at wide-open-throttle.

The exhaust back pressures which would be imposed on the engine by a standard vehicle exhaust system at the different test conditions are noted in Fig. 14.

Fig. 15 shows carbon monoxide concentrations to be generally unaffected by exhaust back pressure increase for this constant-throttle testing.

Had this evaluation been run at constant power, emission of hydrocarbon and carbon monoxide in pounds per hour would have increased with increasing exhaust back pressure at most of the test conditions due to the increase in engine airflow requirement.

VALVE OVERLAP

The effect of valve overlap changes on hydrocarbon and carbon monoxide concentrations was evaluated during engine idle operation. Concentrations during this condition are higher than at any other engine condition, with the exception of deceleration. The valve overlap built into en-

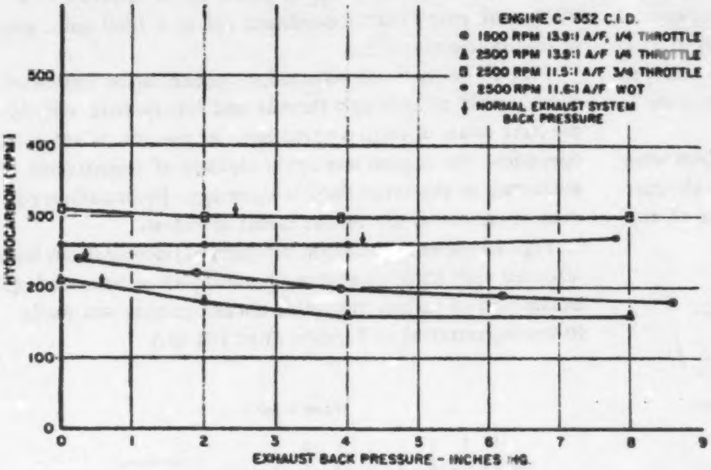

Fig. 14 - Effect of exhaust back pressure on exhaust gas hydrocarbon concentrations

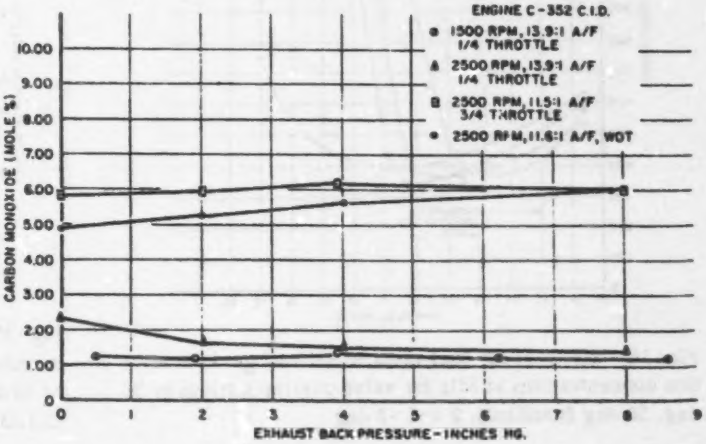

Fig. 15 - Effect of exhaust back pressure on exhaust gas carbon monoxide concentrations

gines to improve breathing at high engine speeds contributes to the high concentration levels. The effect of air-fuel ratio on hydrocarbon and carbon monoxide concentrations at various valve overlap settings was studied on engine B, a 292 CID, V-8.

Engine B was selected because it had mechanical valve lifters which made it possible to adjust the intake and exhaust valve lash to obtain valve overlap settings of 36, 20 (standard), 2, and -3 crankshaft degress. The valve lash change also changed the total number of crankshaft degrees that each valve remained open, and it is not known if this may have influenced the results obtained.

Decreasing the number of degrees during which the intake and exhaust valves are open simultaneously (valve overlap) decreases exhaust gas dilution of the incoming fuel-air mixture. The resulting improvement in the quality of combustion should reduce the hydrocarbon concentration.

Fig. 16 shows the effect of air-fuel ratio on hydrocarbon concentration at idle for the valve overlap settings tested. At the 15:1 air-fuel ratio test condition, hydrocarbon concentrations were decreased considerably as valve overlap was reduced. These curves show that decreasing the valve overlap allows the engine to operate at leaner air-fuel ratios during idle with little change in hydrocarbon concentrations. By reduced overlap at idle, the carburetor operating specification limits (as shown in Fig. 16) might be changed to encompass leaner air-fuel ratios. This change would result in lower carbon monoxide concentrations at idle with little change in hydrocarbon concentration.

Fig. 17 shows that carbon monoxide concentrations were not affected by valve overlap change at any given air-fuel ratio setting. This figure also illustrates the amount of concentration decrease that could be obtained by changing the carburetor specifications to leaner air-fuel ratios.

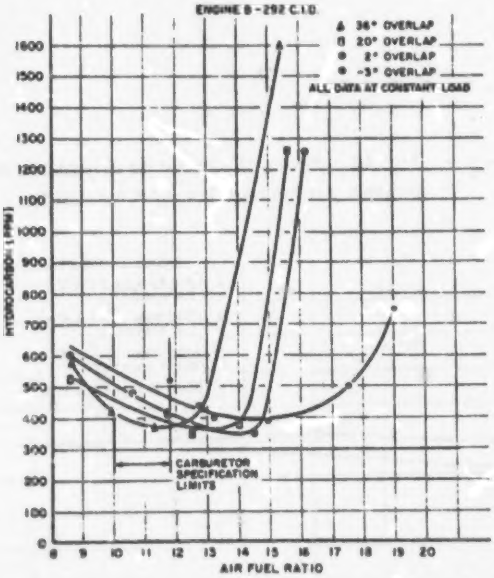

Fig. 16 - Effect of air-fuel ratio on exhaust gas hydrocarbon concentrations at idle for valve overlap settings of 36 deg, 20 deg (standard), 2 and -3 deg

It should be noted here that any decrease in valve overlap from the standard setting will also affect the volumetric efficiency of the engine at higher speeds.

Since reduced valve overlap decreases hydrocarbon concentration at idle by decreasing exhaust gas dilution and improving the quality of combustion, the same effect should also be obtained during deceleration where exhaust gas dilution is more severe. During deceleration, intake manifold pressures are much lower than at idle, and there is a greater cross-flow of exhaust gas from the exhaust manifold to the intake manifold.

COMBUSTION CHAMBER DEPOSITS

A single-cylinder Waukesha engine was cleaned of deposits from previous tests and was then run for 161 hr (equivalent of 5000 miles of vehicle operation) at 2000 rpm part throttle to determine the effect of combustion chamber deposits on exhaust emissions. A standard engine dynamometer testing fuel (A) was used. (See Appendix B.) This engine was evaluated for exhaust gas hydrocarbon and carbon monoxide concentrations at approximate 15-hr intervals at a 2000-rpm, part-throttle condition and at a 1200-rpm, wide-open-throttle condition.

Fig. 18 shows that hydrocarbon concentration increased considerably at both part throttle and full throttle with increasing hours of engine operation. At the end of 161 hr of operation, the engine was again cleaned of deposits and reevaluated at the same throttle openings. Hydrocarbon concentration was at the initial levels or below.

Fig. 19 shows that carbon monoxide concentrations were affected very little as engine operating hours increased. (No evaluation of carbon monoxide concentrations was made following removal of deposits after 161 hr.)

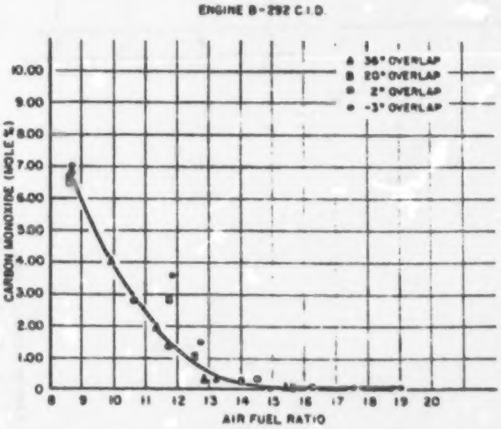

Fig. 17 - Effect of air-fuel ratio on exhaust gas carbon monoxide concentrations at idle for valve overlap settings of 36 deg, 20 deg (standard), 2 and -3 deg. Engine B - 292 C.I.D.

APPENDIX D

RESULTS FROM STEADY-STATES FOLLOWED BY RESULTS FROM FTP AND FET TESTS CONDUCTED ON:

Motorcycle	Page
Honda CB-360	D-2 to D-23
Kawasaki KZ-900	D-24 to D-62
Honda XL-125	D-63 to D-91
Suzuki RE-5	D-92 to D-103
Honda GL-1000	D-104 to D-118
Yamaha RD-400	D-119 to D-129
Kawasaki KH-500	D-130 to D-157
Kawasaki KE-175	D-158 to D-185
Suzuki TS-100	D-186 to D-206
Suzuki GT-750	D-207 to D-222

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE CB 360 T

Date 1/20/77 Sequence CBS-1 Baseline w/ modified exhaust pipes

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1050	----	2.80	4.71	12.1	17.	7,920
20	2	4000	0.43	7.00	6.84	5.8	50.	5,200
30	3	4600	1.04	7.05	7.46	4.9	80.	4,480
40	4	5100	1.95	9.50	7.05	3.5	80.	5,920
50	5	5500	3.17	6.88	9.39	2.5	385.	4,000
60	5	6000	4.59	4.91	11.10	2.0	1325.	3,040
Idle	N	1000	----	2.83	4.32	12.4	23.	5,920

Notes: Settings - as received - and subsequently tuned according owner's manual.

Max. temperature reached during 60 mph S. S. was 175°C, max. gas temp. 745°C

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE CB 360 T

Date 4/14/77 Sequence CBS-2 w/ modified exhaust pipes

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1100	----	1.00	5.40	12.9	37.	14,200
20	2	4000	0.49	2.32	10.55	5.3	130.	2,320
30	3	4700	1.14	0.42	12.65	3.6	465.	840
40	4	5050	2.06	0.41	10.55	3.5	1060.	840
50	5	5500	3.24	0.35	13.40	2.8	1100.	1,250
60	6	5900	4.65	6.77	10.33	1.1	825.	3,520
Idle	N	1200	----	1.50	7.40	9.8	58.	5,360

Notes: CBS-2 conducted with carburetors used on Honda 750K - std. main jetting # 115
Max. head tmp . 230°C
Max. exhaust gas temp. 740°C
W.O.T. accel 9.8 sec.

tested w/ thermal reactor canister in pipe but no core used.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE CB 360 T

Date 4/26/77 Sequence CBS-3 w/ modified exhaust pipes

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1200	----	0.17	6.01	12.7	30.	14,000
20	2	4000	0.50	1.36	11.40	4.4	190.	1,520
30	3	4700	1.15	0.53	12.14	4.0	445.	910
40	4	5050	2.07	0.17	12.38	3.9	1090.	695
50	5	5500	3.20	0.15	12.62	3.7	2400.	890
60	5	5900	4.62	0.13	12.62	3.7	3950.	1,200
Idle	N	1200	----	0.13	6.28	11.9	16.	11,600

Notes: CBS-3 conducted w/ carburetors used on Honda 750 K- main jets # 105 + CDI
Max. head tmp reached during 60 mph S.S. approx. 210°C
max. exhaust gas temp. 760°C at 60 mph
W.O.T. accel 10.0 seconds.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda CB-360

Date 6/3/77 Sequence CBS-4 (results recorded without air addition)

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1300	----	0.15	5.07	13.8	28.	11,300	zero air injection
20	2	4000	0.48	1.17	11.50	4.0	155.	2,000	
30	3	4700	1.13	0.82	11.17	4.8	190.	2,160	
40	4	5050	2.04	0.25	12.87	3.1	680.	650	
50	5	5500	3.25	0.22	13.24	2.5	2600.	600	
60	5	5850	4.65	0.53	13.17	2.3	3470.	720	
Idle	N	1300	----	0.20	6.84	10.4	30.	11,800	

Notes: 750K carburetor + thermal reactor with larger cans (1st design)
Max. head temp. - 200°C at 60 mph
Max. gas temp. - 800°C at 60 mph
WOT accel. time 0 - 100 kph, 10.3 sec
Min. reaction noted by temp. change with large cans at 50 and 60 mph with air flow from 1 to 2.4 cfm

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda CB-360

Date 7/1/77 Sequence CBS-5 (results recorded without air addition)

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1200	----	0.14	7.74	9.5	39.	7,280	
20	2	4000	0.50	2.50	10.99	4.0	130.	1,920	
30	3	4650	1.10	1.36	12.35	3.0	375.	1,160	
40	4	5000	2.01	0.30	12.83	3.3	1050.	480	Zero Air Injection
50	5	5400	3.19	0.39	9.08	8.5	375.	7,320	–Misfire
60	5	5800	4.62	0.33	13.62	9.8	625.	3,040	–Misfire
Idle	N	1200	----	0.33	9.94	9.3	75.	6,400	

Notes: 750 K carburetors installed -- thermal reactors in system (2nd design)
carburetors vacuum aligned
Max. exhaust gas temp. entering thermal reactor: left, 700°C; right, 750°C
Max. head temp. 210°C

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda CB-360

Date 7/7/77 Sequence CBS-6 (results recorded without air addition)

Conditon				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1200	----	0.32	6.16	12.5	55.	12,400	
20	2	3800	0.48	1.85	10.85	5.5	155.	1,440	
30	3	4800	1.09	0.68	11.72	4.3	375.	584	reactions implied by temperature rise between station #1 (port) and station #2 (entering reactor)
40	4	5000	2.02	0.17	12.14	4.0	715.	100	
40	4	5000	2.02	0.18	12.14	4.6	525.	132	
50	5	5400	3.17	0.18	11.28	5.8	325.	98	
60	5	5900	4.52	0.07	12.14	4.7	1125.	76	
Idle	N	1200	----	3.08	6.80	8.8	40.	1,600	--reaction indicated ΔT

Notes: 750 K carburetors installed -- thermal reactors in system (2nd design)
timing retarded approx. 10° from stock at idle
Max. exhaust gas temp. entering thermal reactors: right, 850°C; left, 875°C
Max. gas temp. at station #1 at 60 mph 770°C at 60 mph (upstream of reactor)
Max. head temp. at 60 mph 215°C

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda CB-360

Date 8/10/77 Sequence CBS-7

Condition				Concentrations					Injection Air Rate cfm	
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C		
Idle	N	1200	--	0.36	6.17	11.3	31.	2,320	0.47	
20	2	3800	0.55	3.08	7.55	7.5	50.	1,230	1.70	
30	3	4600	1.12	2.09	9.45	6.1	115.	632	1.97	reaction (via temp.)
40	4	4900	2.01	0.17	12.02	3.7	405.	25	2.08	reaction (via temp.)
50	5	5400	3.19	0.25	11.10	5.0	1650.	144	2.21	
60	6	5700	4.50	0.14	10.88	5.5	2750.	263	2.39	
Idle	N	1400	--	0.81	6.67	10.0	38.	1,220	0.47	

Notes: Lean Carbs set 'rich', + CDI + Thermal Reactors (2nd design) + Air (pump 1533 1:1 ratio) Concentrations are diluted by air addition
W.O.T. 0-100 kph acceleration time: 22.9 sec (run after FTP's + FET's + road evaluations
performed well until after road evaluations
W.O.T. 0-100 kph acceleration time: 17 sec (after repair of air intake boot)

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda CB-360

Date 8/30/77 Sequence CBS-8

Conditon				Concentrations					Exhaust Temp°C		Air Injection Flow, cfm
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Cat Enter	Cat Exit	
Idle	N	1300	--	0.006	7.74	9.9	29.	148	275	500	1.18
20	2	3800	0.45	0.014	12.30	3.5	54.	60	875	775	3.57
30	3	4600	1.08	0.04	13.36	2.1	67.	32	910	875	4.00
40	4	4900	2.01	3.62	12.14	1.3	42.	1070	870	945	4.34
50	5	5300	3.17	0.94	13.30	1.7	190.	108	700	900	4.42
60	6	5700	4.56	0.47	14.00	1.1	495	88	680	900	4.68
Idle	N	1300	--	0.006	7.55	9.5	37.	168	300	550	1.18

Notes: Stock Carburetors (as received) + CDI + Catalyst PTX313 + Air (pump 0440 at 0.5:1) Max. head temperature 190°C
W.O.T. 0-100 kph acceleration time 14.6 seconds

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                          TABLE                       VEHICLE EMISSION RESULTS
UNIT NO.  400        TEST NO. 1              1975  LIGHT DUTY EMISSIONS TEST
VEHICLE MODEL  HONDA CB360T           DATE 10/ 5/76
                                      ENGINE    .36 LITRE 2            MFGR. CODE   -0                    YR.  1976
                                                                       CURB WT.      0 KG                 GVM      0 KG
BAROMETER 737.11 MM OF HG.
DRY BULB TEMP.   27.8 DEG. C                                     WET BULB TEMP  18.3 DEG. C
REL. HUMIDITY     40 PCT.                                        ABS. HUMIDITY   9.5 GRAMS/KG
                                                                 DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 889.0 MM. H20                        BLOWER INLET PRESS., G1 812.8 MM. H20
    BAG RESULTS                                                  BLOWER INLET TEMP.   43 DEG. C
    BAG NO.
    BLOWER REVOLUTIONS                            1              2              3
    ROLL COUNTS                                7062          11963           6988
    HC   SAMPLE  METER READING/SCALE            3469           3705           3476
    HC   SAMPLE  PPM                            87.7/3         30.9/3         37.0/3
    HC   BACKGRD METER READING/SCALE            877            304            370
    HC   BACKGRD PPM                            1.4/3          2.0/3          1.5/3
    CO   SAMPLE  METER READING/SCALE            14             20             15
    CO   SAMPLE  PPM                            56.7/2         48.9/2         59.0/2
    CO   BACKGRD METER READING/SCALE            2863           2338           3028
    CO   BACKGRD PPM                            .5/2           .8/2           .8/2
    CO2  SAMPLE  METER READING/SCALE            19             30             30
    CO2  SAMPLE  PERCENT                        25.5/3         14.3/3         22.8/3
    CO2  BACKGRD METER READING/SCALE            .42            .23            .37
    CO2  BACKGRD PERCENT                        2.9/3          3.2/3          2.8/3
    NOX  SAMPLE  METER READING/SCALE            .04            .05            .04
    NOX  SAMPLE  PPM                            11.1/2         2.2/2          9.3/2
    NOX  BACKGRD METER READING/SCALE            11.1           2.2            9.3
    NOX  BACKGRD PPM                            .5/2           .4/2           .6/2
    SO2  SAMPLE  METER READING/SCALE            .5             .4             .6
    SO2  SAMPLE  PPM                            -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD METER READING/SCALE            0.0            0.0            0.0
    SO2  BACKGRD PPM                            -0.0/*         -0.0/*         -0.0/*
                                                0.0            0.0            0.0
    HC   CONCENTRATION PPM
    CO   CONCENTRATION PPM                      864            290            356
    CO2  CONCENTRATION PCT                      2785           2269           2939
    NOX  CONCENTRATION PPM                      .37            .18            .33
    SO2  CONCENTRATION PPM                      10.6           1.8            8.7
    HC   MASS GRAMS                             0.0            0.0            0.0
    CO   MASS GRAMS                             22.67          12.88          9.24
    CO2  MASS GRAMS                             147.58         203.67         154.10
    NOX  MASS GRAMS                             313.41         253.83         272.38
    SO2  MASS GRAMS                             .89            .26            .72
    TOTAL CARBON GRAMS                          0.00           0.00           0.00
                                                168.44         167.76         148.42
    WEIGHTED MASS HC       2.34 GRAMS/KILOMETRE
    WEIGHTED MASS CO      29.75 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     45.58 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .09 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.93 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  23.7  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST               484.62 GRAMS
    ESTIMATED FUEL WEIGHT =   .56KG.
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      TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                             VEHICLE NUMBER 400

DATE 10/ 5/76                   TIME    -0 HRS.         TEST NO.  1
MODEL  1976 HONDA CB360         HIWAY CYCLE FET         ENGINE  .4 LITRE2 *
DRIVER   TJ                     TEST WT.     0 KG.      GVW    0 KG
WET BULB TEMP  18 C             DRY BULB TEMP  28 C     REL. HUM.  36.7 PCT
SPEC. HUM.    8.8 GRAM/KG       BARO.  739.4 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION          12.63 MINUTES
  BLOWER INLET PRESS.   812.8  MM. H20
  BLOWER DIF.  PRESS.   889.0  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9901
  DISTANCE TRAVELED    16.46  KILOMETRES
  BLOWER REVOLUTIONS     10538
  BLOWER CU. CM /REV.   7831

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                31.2/3
   HC   SAMPLE  PPM                                 312
   HC   BACKGRD METER READING/SCALE                  .9/3
   HC   BACKGRD PPM                                   9
   CO   SAMPLE  METER READING/SCALE                80.7/2
   CO   SAMPLE  PPM                               4806
   CO   BACKGRD METER READING/SCALE                  .9/2
   CO   BACKGRD PPM                                  34
   CO2  SAMPLE  METER READING/SCALE                36.6/3
   CO2  SAMPLE  PERCENT                              .61
   CO2  BACKGRD METER READING/SCALE                 2.9/3
   CO2  BACKGRD PERCENT                              .04
   NOX  SAMPLE  METER READING/SCALE                23.3/2
   NOX  SAMPLE  PPM                                23.3
   NOX  BACKGRD METER READING/SCALE                  .4/2
   NOX  BACKGRD PPM                                  .4
   HC   CONCENTRATION PPM                           304
   CO   CONCENTRATION PPM                          4661
   CO2  CONCENTRATION PCT                           .57
   NOX  CONCENTRATION PPM                          22.9
   SO2  COCENTRATION PPM                            0.0
   HC   MASS (GRAMS)                              11.97
   CO   MASS (GRAMS)                             370.98
   CO2  MASS (GRAMS)                             721.87
   NOX  MASS (GRAMS)                               2.82
   SO2  MASS (GRAMS)                               0.00

HC   GRAMS/KILOMETRE        .73
CO   GRAMS/KILOMETRE      22.54
CO2  GRAMS/KILOMETRE      43.86
NOX  GRAMS/KILOMETRE        .17
SO2  GRAMS/KILOMETRE       0.00

HC   GRAMS/KG OF FUEL  28.26     HC   GRAMS/MIN     .95
CO   GRAMS/KG OF FUEL  875.7     CO   GRAMS/MIN    29.4
CO2  GRAMS/KG OF FUFL   1704     CO2  GRAMS/MIN      57
NOX  GRAMS/KG OF FUEL   6.65     NOX  GRAMS/MIN     .22
SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                     28.54  KILOMETRES/LITRE
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              TABLE                           VEHICLE EMISSION RESULTS
                                       1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  400         TEST NO. 2       DATE 10/ 7/76
VEHICLE MODEL  HONDA CB360T            ENGINE     .36 LITRE 2       MFGR. CODE    -0
                                                                    CURB WT.       0 KG        YR.  1976
BAROMETER 742.95 MM OF HG.                                                                     GVW      0 KG
DRY BULB TEMP.    25.6 DEG. C                                 WET BULB TEMP  16.1 DEG. C
REL. HUMIDITY      37 PCT.                                    ABS. HUMIDITY   7.6 GRAMS/KG
                                                              DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

   BLOWER DIF. PRESS., G2, *78.0 MM. H20                      BLOWER INLET PRESS., G1 *00.2 MM. H20
   BAG RESULTS                                                BLOWER INLET TEMP.    43 DEG. C
   BAG NO.
   BLOWER REVOLUTIONS                           1              2              3
   ROLL COUNTS                              10391          17816          10371
   HC   SAMPLE  METER READING/SCALE          3416           3697           3486
   HC   SAMPLE  PPM                        11.5/4         22.5/3         25.8/3
   HC   BACKGRD METER READING/SCALE          1150            225            258
   HC   BACKGRD PPM                          .8/4          1.7/3          1.8/3
   CO   SAMPLE  METER READING/SCALE            80             17             18
   CO   SAMPLE  PPM                        48.4/2         38.9/2         44.1/2
   CO   BACKGRD METER READING/SCALE          2307           1742           2042
   CO   BACKGRD PPM                         1.2/2          1.5/2          1.1/2
   CO2  SAMPLE  METER READING/SCALE            46             57             42
   CO2  SAMPLE  PERCENT                    21.7/3         12.8/3         16.4/3
   CO2  BACKGRD METER READING/SCALE           .35            .20            .26
   CO2  BACKGRD PERCENT                     6.1/3          6.6/3          4.6/3
   NOX  SAMPLE  METER READING/SCALE           .09            .10            .07
   NOX  SAMPLE  PPM                         8.2/2          2.6/2          5.6/2
   NOX  BACKGRD METER READING/SCALE           8.2            2.6            5.6
   NOX  BACKGRD PPM                         1.2/2          1.0/2           .9/2
   SO2  SAMPLE  METER READING/SCALE           1.2            1.0             .9
   SO2  SAMPLE  PPM                        -0.0/*         -0.0/*         -0.0/*
   SO2  BACKGRD METER READING/SCALE           0.0            0.0            0.0
   SO2  BACKGRD PPM                        -0.0/*         -0.0/*         -0.0/*
                                              0.0            0.0            0.0
   HC   CONCENTRATION PPM
   CO   CONCENTRATION PPM                    1074            209            241
   CO2  CONCENTRATION PCT                    2221           1660           1968
   NOX  CONCENTRATION PPM                     .26            .10            .19
   SO2  CONCENTRATION PPM                     7.1            1.6            4.7
   HC   MASS GRAMS                            0.0            0.0            0.0
   CO   MASS GRAMS                          37.54          12.49           8.40
   CO2  MASS GRAMS                         156.72         200.88         138.60
   NOX  MASS GRAMS                         291.18         196.02         214.60
   SO2  MASS GRAMS                            .74            .29            .50
   TOTAL CARBON GRAMS                        0.00           0.00           0.00
                                           179.17         150.45         125.27
   WEIGHTED MASS HC       2.81 GRAMS/KILOMETRE
   WEIGHTED MASS CO      29.21 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     37.30 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .08 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE        11.89 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  25.7  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST            454.89 GRAMS
   ESTIMATED FUEL WEIGHT =    .53KG.
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TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                         VEHICLE NUMBER 400

DATE 10/ 7/76                  TIME                          TEST NO.  2
MODEL  1976 HONDA CB360T       HIWAY CYCLE                   ENGINE  .4 LITRE  2
DRIVER   TJ                    TEST WT.        0 KG.         GVW    0 KG
WET BULB TEMP  16 C            DRY BULB TEMP  24 C           REL. HUM.  44.3 PCT
SPEC. HUM.   8.3 GRAM/KG       BARO.  742.4 MM  HG.          MEASURED FUEL  0.00 KG

  RUN DURATION            12.77 MINUTES
  BLOWER INLET PRESS.   812.8  MM. H2O
  BLOWER DIF.  PRESS.   914.4  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9885
  DISTANCE TRAVELED    16.43  KILOMETRES
  BLOWER REVOLUTIONS     10532
  BLOWER CU. CM /REV.  7785

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                    30.3/3
   HC  SAMPLE  PPM                                    303
   HC  BACKGRD METER READING/SCALE                     1.2/3
   HC  BACKGRD PPM                                     12
   CO  SAMPLE  METER READING/SCALE                    80.2/2
   CO  SAMPLE  PPM                                    4761
   CO  BACKGRD METER READING/SCALE                     1.0/2
   CO  BACKGRD PPM                                     38
   CO2 SAMPLE  METER READING/SCALE                    35.2/3
   CO2 SAMPLE  PERCENT                                 .59
   CO2 BACKGRD METER READING/SCALE                     4.4/3
   CO2 BACKGRD PERCENT                                 .07
   NOX SAMPLE  METER READING/SCALE                    22.6/2
   NOX SAMPLE  PPM                                    22.6
   NOX BACKGRD METER READING/SCALE                     1.1/2
   NOX BACKGRD PPM                                     1.1
   HC  CONCENTRATION PPM                              292
   CO  CONCENTRATION PPM                             4605
   CO2 CONCENTRATION PCT                               .53
   NOX CONCENTRATION PPM                              21.6
   SO2 COCENTRATION PPM                               0.0
   HC  MASS (GRAMS)                                  11.49
   CO  MASS (GRAMS)                                 365.78
   CO2 MASS (GRAMS)                                 661.39
   NOX MASS (GRAMS)                                   2.61
   SO2 MASS (GRAMS)                                   0.00

HC  GRAMS/KILOMETRE       .70
CO  GRAMS/KILOMETRE     22.26
CO2 GRAMS/KILOMETRE     40.25
NOX GRAMS/KILOMETRE       .16
SO2 GRAMS/KILOMETRE      0.00

HC  GRAMS/KG OF FUEL  28.61     HC  GRAMS/MIN    .90
CO  GRAMS/KG OF FUEL  911.0     CO  GRAMS/MIN   28.6
CO2 GRAMS/KG OF FUEL   1647     CO2 GRAMS/MIN     52
NOX GRAMS/KG OF FUEL   6.51     NOX GRAMS/MIN    .20
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                 30.06  KILOMETRES/LITRE
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                          TABLE                                VEHICLE EMISSION RESULTS
                                                         1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  900          TEST NO. 1              DATE  9/14/77                      MFGR. CODE   -0
VEHICLE MODEL  CB36AT +950KCARB               ENGINE      .38 LITRE 2            CURB WT.      0 KG                YR.  1976
                                                                                                                    GVM      0 KG
BAROMETER 735.58 MM OF HG,
DRY BULB TEMP.    25.0 DEG. C                                                    WET BULB TEMP  19.4 DEG. C
REL. HUMIDITY      60 PCT,                                                       ABS. HUMIDITY  12.2 GRAMS/KG
                                                                                 DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

     BLOWER DIF. PRESS., G2, 812.8 MM. H2O                                       BLOWER INLET PRESS., G1 736.6 MM. H2O
     BAG RESULTS                                                                 BLOWER INLET TEMP.    43 DEG. C
     BAG NO.                                           1                2                3
     BLOWER REVOLUTIONS                               6951            11962             6962
     ROLL COUNTS                                       3496            3776             3484
     HC    SAMPLE  METER READING/SCALE                18.9/3           11.5/3           14.9/3
     HC    SAMPLE  PPM                                 189              115              149
     HC    BACKGRD METER READING/SCALE                 1.9/3            1.8/3            1.7/3
     HC    BACKGRD PPM                                  19               18               17
     CO    SAMPLE  METER READING/SCALE                24.6/3           85.4/4           28.5/3
     CO    SAMPLE  PPM                                 572              904              669
     CO    BACKGRD METER READING/SCALE                 .4/3             .5/3             .3/3
     CO    BACKGRD PPM                                   9               11                6
     CO2   SAMPLE  METER READING/SCALE                33.0/3           22.5/3           30.7/3
     CO2   SAMPLE  PERCENT                              .55              .36              .51
     CO2   BACKGRD METER READING/SCALE                 3.9/3            4.6/3            4.8/3
     CO2   BACKGRD PERCENT                              .06              .07              .07
     NOX   SAMPLE  METER READING/SCALE                26.3/2           10.0/2           32.7/2
     NOX   SAMPLE  PPM                                 26.3             10.0             32.7
     NOX   BACKGRD METER READING/SCALE                  .6/2             .6/2             .6/2
     NOX   BACKGRD PPM                                   .6               .6               .6
     SO2   SAMPLE  METER READING/SCALE                -0.0/*           -0.0/*           -0.0/*
     SO2   SAMPLE  PPM                                  0.0              0.0              0.0
     SO2   BACKGRD METER READING/SCALE                -0.0/*           -0.0/*           -0.0/*
     SO2   BACKGRD PPM                                  0.0              0.0              0.0

     HC    CONCENTRATION PPM                            176               98              133
     CO    CONCENTRATION PPM                            547              383              643
     CO2   CONCENTRATION PCT                            .50              .30              .44
     NOX   CONCENTRATION PPM                           25.7              9.4             32.1
     SO2   CONCENTRATION PPM                            0.0              0.0              0.0
     HC    MASS GRAMS                                  4.83             4.62             3.66
     CO    MASS GRAMS                                 30.34            36.63            38.77
     CO2   MASS GRAMS                                434.29           446.30           384.20
     NOX   MASS GRAMS                                  2.47             1.55             3.09
     SO2   MASS GRAMS                                  0.00             0.00             0.00
     TOTAL CARBON GRAMS                              135.72           141.61           123.36

     WEIGHTED MASS HC        .73 GRAMS/KILOMETRE
     WEIGHTED MASS CO       5.80 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     70.55 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .36 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE        12.08 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  28.7  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST               400.58 GRAMS
     ESTIMATED FUEL WEIGHT =   .46KG.
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          TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                                  VEHICLE NUMBER 400

DATE  9/14/77               TIME     -0 HRS.          TEST NO.  1
MODEL  1976 HONDA CB360T FET +750K CARB ST            ENGINE  .4 LITRE  2
DRIVER   KN                 TEST WT.      0 KG.       GVW     0 KG
WET BULB TEMP  19 C         DRY BULB TEMP  25 C       REL. HUM.  59.3 PCT
SPEC. HUM.  11.8 GRAM/KG    BARO.  758.2 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION          12.76 MINUTES
  BLOWER INLET PRESS.  736.6  MM. H20
  BLOWER DIF.  PRESS.  812.8  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10035
  DISTANCE TRAVELED    16.68  KILOMETRES
  BLOWER REVOLUTIONS     10527
  BLOWER CU. CM /REV.  8289

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE             17.0/3
   HC   SAMPLE  PPM                              170
   HC   BACKGRD METER READING/SCALE              1.5/3
   HC   BACKGRD PPM                               15
   CO   SAMPLE  METER READING/SCALE             50.9/3
   CO   SAMPLE  PPM                             1255
   CO   BACKGRD METER READING/SCALE               .3/3
   CO   BACKGRD PPM                                6
   CO2  SAMPLE  METER READING/SCALE             46.9/3
   CO2  SAMPLE  PERCENT                          .81
   CO2  BACKGRD METER READING/SCALE              3.7/3
   CO2  BACKGRD PERCENT                          .06
   NOX  SAMPLE  METER READING/SCALE             81.9/2
   NOX  SAMPLE  PPM                             81.9
   NOX  BACKGRD METER READING/SCALE              1.2/2
   NOX  BACKGRD PPM                              1.2
   HC   CONCENTRATION PPM                        156
   CO   CONCENTRATION PPM                       1206
   CO2  CONCENTRATION PCT                        .75
   NOX  CONCENTRATION PPM                       80.8
   SO2  COCENTRATION PPM                        0.0
   HC   MASS (GRAMS)                            6.74
   CO   MASS (GRAMS)                          105.14
   CO2  MASS (GRAMS)                         1039.49
   NOX  MASS (GRAMS)                           11.98
   SO2  MASS (GRAMS)                            0.00

HC   GRAMS/KILOMETRE        .40
CO   GRAMS/KILOMETRE       6.30
CO2  GRAMS/KILOMETRE      62.32
NOX  GRAMS/KILOMETRE        .72
SO2  GRAMS/KILOMETRE       0.00

HC   GRAMS/KG OF FUEL  17.42     HC   GRAMS/MIN     .53
CO   GRAMS/KG OF FUEL  271.8     CO   GRAMS/MIN     8.2
CO2  GRAMS/KG OF FUEL   2687     CO2  GRAMS/MIN     81
NOX  GRAMS/KG OF FUEL  30.98     NOX  GRAMS/MIN     .94
SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
CARBON BALANCE FUFL ECONOMY                      31.68  KILOMETRES/LITRE
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                        TABLE                          VEHICLE EMISSION RESULTS
                                                1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  400        TEST NO. 1          DATE  9/26/77
VEHICLE MODEL  CB360T +750KCARB #105     ENGINE    .38 LITRE 2         MFGR. CODE    -0                    YR.  1976
                                                                       CURB WT.      0 KG                  GVM      0 KG
BAROMETER 744.22 MM OF HG.
DRY BULB TEMP.   26.1 DEG. C                                       WET BULB TEMP  16.1 DEG. C
REL. HUMIDITY     34 PCT.                                          ABS. HUMIDITY   7.4 GRAMS/KG
                                                                   DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 812.8 MM. H20                          BLOWER INLET PRESS., G1 762.0 MM. H20
    BAG RESULTS                                                    BLOWER INLET TEMP.   43 DEG. C
    BAG NO.                                    1             2             3
    BLOWER REVOLUTIONS                      6961         11934          6934
    ROLL COUNTS                             3466          3793          3514
    HC   SAMPLE  METER READING/SCALE      17.7/3        98.0/2        11.5/3
    HC   SAMPLE  PPM                         177            98           115
    HC   BACKGRD METER READING/SCALE       2.1/3         2.0/3        14.7/2
    HC   BACKGRD PPM                          21            20            15
    CO   SAMPLE  METER READING/SCALE      80.5/*        63.9/*        47.3/*
    CO   SAMPLE  PPM                         188           261           176
    CO   BACKGRD METER READING/SCALE       2.9/*         4.1/*         1.9/*
    CO   BACKGRD PPM                           5             7             4
    CO2  SAMPLE  METER READING/SCALE      31.1/3        20.6/3        28.2/3
    CO2  SAMPLE  PERCENT                     .52           .33           .46
    CO2  BACKGRD METER READING/SCALE       3.4/3         3.5/3         4.4/3
    CO2  BACKGRD PERCENT                     .05           .05           .07
    NOX  SAMPLE  METER READING/SCALE      38.4/2        11.6/2        47.1/2
    NOX  SAMPLE  PPM                        38.4          11.6          47.1
    NOX  BACKGRD METER READING/SCALE        .7/2          .7/2          .7/2
    NOX  BACKGRD PPM                          .7            .7            .7
    SO2  SAMPLE  METER READING/SCALE      -0.0/*        -0.0/*        -0.0/*
    SO2  SAMPLE  PPM                         0.0           0.0           0.0
    SO2  BACKGRD METER READING/SCALE      -0.0/*        -0.0/*        -0.0/*
    SO2  BACKGRD PPM                         0.0           0.0           0.0

    HC   CONCENTRATION PPM                   157            79           101
    CO   CONCENTRATION PPM                   180           250           169
    CO2  CONCENTRATION PCT                   .47           .28           .40
    NOX  CONCENTRATION PPM                  37.7          10.9          46.4
    SO2  CONCENTRATION PPM                   0.0           0.0           0.0
    HC   MASS GRAMS                         4.37          3.75          2.80
    CO   MASS GRAMS                        10.10         24.04          9.44
    CO2  MASS GRAMS                       413.07        425.61        352.42
    NOX  MASS GRAMS                         3.14          1.56          3.85
    SO2  MASS GRAMS                         0.00          0.00          0.00
    TOTAL CARBON GRAMS                    120.84        129.71        102.65

    WEIGHTED MASS HC        .60 GRAMS/KILOMETRE
    WEIGHTED MASS CO       2.79 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     66.39 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .42 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        12.11 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  32.3  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              353.21 GRAMS
    ESTIMATED FUEL WEIGHT =   .41KG.
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       TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                               VEHICLE NUMBER 400

DATE  4/26/77                    TIME    -0 HRS.         TEST NO.  1
MODEL  1976 HONDA CB360 FET +750K CARB 105               ENGINE  .4 LITRE  2
DRIVER   KN                      TEST WT.      0 KG.     GVW    0 KG
WET BULB TEMP  16 C              DRY BULB TEMP  26 C     REL. HUM.  33.6 PCT
SPEC. HUM.   7.0 GRAM/KG         BARO.  744.7 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION            12.76 MINUTES
  BLOWER INLET PRESS.  762.0  MM. H20
  BLOWER DIF.  PRESS.  812.8  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9936
  DISTANCE TRAVELED   16.52  KILOMETRES
  BLOWER REVOLUTIONS     10531
  BLOWER CU. CM /REV.  8269

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE             12.4/3
   HC   SAMPLE  PPM                              124
   HC   BACKGRD METER READING/SCALE              1.5/3
   HC   BACKGRD PPM                               15
   CO   SAMPLE  METER READING/SCALE             94.4/*
   CO   SAMPLE  PPM                              483
   CO   BACKGRD METER READING/SCALE              1.4/*
   CO   BACKGRD PPM                                4
   CO2 SAMPLE  METER READING/SCALE              44.9/3
   CO2 SAMPLE  PERCENT                           .77
   CO2 BACKGRD METER READING/SCALE               3.6/3
   CO2 BACKGRD PERCENT                           .06
   NOX SAMPLE  METER READING/SCALE              42.6/3
   NOX SAMPLE  PPM                             127.8
   NOX BACKGRD METER READING/SCALE                .4/3
   NOX BACKGRD PPM                               1.2
   HC   CONCENTRATION PPM                        110
   CO   CONCENTRATION PPM                        466
   CO2 CONCENTRATION PCT                         .72
   NOX CONCENTRATION PPM                       126.7
   SO2 COCENTRATION PPM                         0.0
   HC   MASS (GRAMS)                            4.63
   CO   MASS (GRAMS)                           39.68
   CO2 MASS (GRAMS)                           964.87
   NOX MASS (GRAMS)                            15.76
   SO2 MASS (GRAMS)                             0.00

HC   GRAMS/KILOMETRE       .28
CO   GRAMS/KILOMETRE      2.40
CO2 GRAMS/KILOMETRE     58.42
NOX GRAMS/KILOMETRE       .95
SO2 GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL  14.09      HC   GRAMS/MIN     .36
CO   GRAMS/KG OF FUEL  120.7      CO   GRAMS/MIN     3.1
CO2 GRAMS/KG OF FUEL   2935      CO2 GRAMS/MIN      76
NOX GRAMS/KG OF FUEL  47.94      NOX GRAMS/MIN    1.23
SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                   36.91  KILOMETRES/LITRE
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                     TABLE                   VEHICLE EMISSION RESULTS
                                          1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  400        TEST NO. 2           DATE  4/27/77                        MFGR. CODE   -0                    YR.  1976
VEHICLE MODEL  CB360T +750KCARB #105      ENGINE      .38 LITRE 2              CURB WT.     0 KG                  GVM      0 KG

BAROMETER 744.47 MM OF HG.                                                     WET BULB TEMP  19.4 DEG. C
DRY BULB TEMP.   26.7 DEG. C                                                   ABS. HUMIDITY  11.3 GRAMS/KG
REL. HUMIDITY     51 PCT.                                                      DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                               BLOWER INLET PRESS., G1 756.9 MM. H2O
    BLOWER DIF. PRESS., G2, 825.5 MM. H2O                                      BLOWER INLET TEMP.   43 DEG. C
    BAG RESULTS
    BAG NO.                                     1               2               3
    BLOWER REVOLUTIONS                       6969           11937            6956
    ROLL COUNTS                               3497            3783            3511
    HC   SAMPLE  METER READING/SCALE         22.6/3          10.0/3          12.2/3
    HC   SAMPLE  PPM                          226             100             122
    HC   BACKGRD METER READING/SCALE          1.5/3           1.6/3           1.8/3
    HC   BACKGRD PPM                           15              16              18
    CO   SAMPLE  METER READING/SCALE         71.4/*          95.9/*          70.0/*
    CO   SAMPLE  PPM                          163             239             159
    CO   BACKGRD METER READING/SCALE          2.7/*           4.5/*           2.3/*
    CO   BACKGRD PPM                            5               8               4
    CO2  SAMPLE  METER READING/SCALE         33.5/3          20.8/3          28.9/3
    CO2  SAMPLE  PERCENT                      .56             .34             .48
    CO2  BACKGRD METER READING/SCALE          3.7/3           4.3/3           3.8/3
    CO2  BACKGRD PERCENT                      .06             .07             .06
    NOX  SAMPLE  METER READING/SCALE         35.6/2           9.8/2          42.3/2
    NOX  SAMPLE  PPM                         35.6             9.8            42.3
    NOX  BACKGRD METER READING/SCALE           .7/2            .7/2            .8/2
    NOX  BACKGRD PPM                           .7              .7              .8
    SO2  SAMPLE  METER READING/SCALE        -0.0/*          -0.0/*          -0.0/*
    SO2  SAMPLE  PPM                          0.0             0.0             0.0
    SO2  BACKGRD METER READING/SCALE        -0.0/*          -0.0/*          -0.0/*
    SO2  BACKGRD PPM                          0.0             0.0             0.0

    HC   CONCENTRATION PPM                    212              84             105
    CO   CONCENTRATION PPM                    154             226             151
    CO2  CONCENTRATION PCT                    .50             .27             .42
    NOX  CONCENTRATION PPM                   34.9             9.1            41.5
    SO2  CONCENTRATION PPM                    0.0             0.0             0.0
    HC   MASS GRAMS                          5.89            4.03            2.91
    CO   MASS GRAMS                          8.64           21.72            8.47
    CO2  MASS GRAMS                        447.49          412.21          372.28
    NOX  MASS GRAMS                          3.29            1.47            3.90
    SO2  MASS GRAMS                          0.00            0.00            0.00
    TOTAL CARBON GRAMS                     130.93          125.30          107.75

    WEIGHTED MASS HC        .68 GRAMS/KILOMETRE
    WEIGHTED MASS CO       2.50 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     67.43 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .42 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.12 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  31.9  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST             363.98 GRAMS
    ESTIMATED FUEL WEIGHT =    .42KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 400

DATE  4/27/77               TIME    -0 HRS.         TEST NO.  2
MODEL  1976 HONDA CB360 FET +750K CAPB 105          ENGINE  .4 LITRE  2
DRIVER   KN                 TEST WT.     0 KG.      GVW    0 KG
WET BULB TEMP  19 C         DRY BULB TEMP  26 C     REL. HUM.  56.5 PCT
SPEC. HUM.  11.8 GRAM/KG    BARO.  744.2 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION           12.77 MINUTES
  BLOWER INLET PRESS.  756.9  MM. H20
  BLOWER DIF.  PRESS.  825.5  MM  H20
  BLOWER INLET TEMP.     43  DEG. C
  DYNO REVOLUTIONS     9942
  DISTANCE TRAVELED   16.53  KILOMETRES
  BLOWER REVOLUTIONS    10534
  BLOWER CU. CM /REV.  8253

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE              11.5/3
   HC  SAMPLE  PPM                               115
   HC  BACKGRD METER READING/SCALE               1.5/3
   HC  BACKGRD PPM                                15
   CO  SAMPLE  METER READING/SCALE              63.9/*
   CO  SAMPLE  PPM                               261
   CO  BACKGRD METER READING/SCALE               1.1/*
   CO  BACKGRD PPM                                 3
   CO2 SAMPLE  METER READING/SCALE              45.4/3
   CO2 SAMPLE  PERCENT                           .78
   CO2 BACKGRD METER READING/SCALE               4.1/3
   CO2 BACKGRD PERCENT                           .06
   NOX SAMPLE  METER READING/SCALE              41.1/3
   NOX SAMPLE  PPM                             123.3
   NOX BACKGRD METER READING/SCALE                .5/3
   NUX BACKGRD PPM                               1.5
   HC  CONCENTRATION PPM                         101
   CO  CONCENTRATION PPM                         249
   CO2 CONCENTRATION PCT                         .72
   NOX CONCENTRATION PPM                       121.9
   SO2 COCENTRATION PPM                         0.0
   HC  MASS (GRAMS)                             4.25
   CO  MASS (GRAMS)                            21.19
   CO2 MASS (GRAMS)                           466.02
   NOX MASS (GRAMS)                            17.64
   SO2 MASS (GRAMS)                             0.00

HC  GRAMS/KILOMETRE       .26
CO  GRAMS/KILOMETRE      1.28
CO2 GRAMS/KILOMETRE     58.45
NOX GRAMS/KILOMETRE      1.07
SO2 GRAMS/KILOMETRE      0.00

HC  GRAMS/KG OF FUEL  13.29     HC  GRAMS/MIN     .33
CO  GRAMS/KG OF FUEL   66.3     CO  GRAMS/MIN     1.7
CO2 GRAMS/KG OF FUEL   3023     CO2 GRAMS/MIN      76
NOX GRAMS/KG OF FUEL  55.19     NOX GRAMS/MIN    1.38
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                     37.99  KILOMETRES/LITRE
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                    TABLE                             VEHICLE EMISSION RESULTS
UNIT NO.  400        TEST NO. 1                  1975  LIGHT DUTY EMISSIONS TEST
VEHICLE MODEL  CB360 TRMAL+AIR + RICH      DATE  8/12/77
                                           ENGINE     .36 LITRE 2          MFGR. CODE    -0                   YR.  1976
                                                                           CURB WT.       0 KG                GVM      0 KG
BAROMETER 742.19 MM OF HG.
DRY BULB TEMP.    27.8 DEG. C                                          WET BULB TEMP  21.7 DEG. C
REL. HUMIDITY      58 PCT.                                             ABS. HUMIDITY  14.0 GRAMS/KG
                                                                       DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 812.8 MM. H2O                              BLOWER INLET PRESS., G1 736.6 MM. H2O
    BAG RESULTS                                                        BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                  1              2              3
    BLOWER REVOLUTIONS                    6958          12004           6954
    ROLL COUNTS                           3497           3792           3499
    HC   SAMPLE  METER READING/SCALE    12.0/3         53.9/2         80.7/2
    HC   SAMPLE  PPM                       120             54             81
    HC   BACKGRD METER READING/SCALE     1.0/3          1.2/3         12.4/2
    HC   BACKGRD PPM                        10             12             12
    CO   SAMPLE  METER READING/SCALE    68.0/*         71.2/*         76.0/*
    CO   SAMPLE  PPM                       286            306            338
    CO   BACKGRD METER READING/SCALE     1.2/*          2.3/*          2.6/*
    CO   BACKGRD PPM                         4              7              8
    CO2  SAMPLE  METER READING/SCALE    28.9/3         22.3/3         25.6/3
    CO2  SAMPLE  PERCENT                   .48            .36            .42
    CO2  BACKGRD METER READING/SCALE     3.2/3          3.1/3          3.2/3
    CO2  BACKGRD PERCENT                   .05            .05            .05
    NOX  SAMPLE  METER READING/SCALE    30.3/2          5.7/2         25.2/2
    NOX  SAMPLE  PPM                      30.3            5.7           25.2
    NOX  BACKGRD METER READING/SCALE     1.2/2          1.0/2          1.5/2
    NOX  BACKGRD PPM                       1.2            1.0            1.5
    SO2  SAMPLE  METER READING/SCALE    -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                       0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE    -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                       0.0            0.0            0.0

   HC   CONCENTRATION PPM                  110             42             69
   CO   CONCENTRATION PPM                  275            292            321
   CO2  CONCENTRATION PCT                  .43            .31            .37
   NOX  CONCENTRATION PPM                 29.1            4.7           23.8
   SO2  CONCENTRATION PPM                  0.0            0.0            0.0
   HC   MASS GRAMS                        3.07           2.03           1.91
   CO   MASS GRAMS                       15.44          28.26          18.03
   CO2  MASS GRAMS                      380.60         481.92         328.69
   NOX  MASS GRAMS                        3.02            .84           2.46
   SO2  MASS GRAMS                        0.00           0.00           0.00
   TOTAL CARBON GRAMS                   113.15         145.90          99.09

   WEIGHTED MASS HC        .37 GRAMS/KILOMETRE
   WEIGHTED MASS CO       3.73 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     68.74 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .29 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE       12.12 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  31.0  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST                357.64 GRAMS
   FSTIMATED FUEL WEIGHT =   .41KG.
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     TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                               VEHICLE NUMBER 400

DATE  8/15/77                TIME     -0 HRS.         TEST NO.  1
MODEL  1976 HONDA CB360 FET    THERMAL+AIR + RICH  ENGINE  .4 LITRE  2
DRIVER   RE                  TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  22 C          DRY BULB TEMP  28 C     REL. HUM.  55.6 PCT
SPEC. HUM.  13.8 GRAM/KG     BARO.  740.9 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION           12.84 MINUTES
  BLOWER INLET PRESS.  711.2  MM. H2O
  BLOWER DIF.  PRESS.  812.8  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9902
  DISTANCE TRAVELED   16.46  KILOMETRES
  BLOWER REVOLUTIONS     10601
  BLOWER CU. CM /REV.  8270

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                83.8/2
   HC   SAMPLE  PPM                                   84
   HC   BACKGRD METER READING/SCALE                12.8/2
   HC   BACKGRD PPM                                   13
   CO   SAMPLE  METER READING/SCALE                62.6/*
   CO   SAMPLE  PPM                                  255
   CO   BACKGRD METER READING/SCALE                  .8/*
   CO   BACKGRD PPM                                    2
   CO2  SAMPLE  METER READING/SCALE                47.2/3
   CO2  SAMPLE  PERCENT                              .81
   CO2  BACKGRD METER READING/SCALE                 4.3/3
   CO2  BACKGRD PERCENT                              .07
   NOX  SAMPLE  METER READING/SCALE                80.8/2
   NOX  SAMPLE  PPM                                80.8
   NOX  BACKGRD METER READING/SCALE                 1.1/2
   NOX  BACKGRD PPM                                  1.1
   HC   CONCENTRATION PPM                             72
   CO   CONCENTRATION PPM                            244
   CO2  CONCENTRATION PCT                            .75
   NOX  CONCENTRATION PPM                           79.8
   SO2  COCENTRATION PPM                            0.0
   HC   MASS (GRAMS)                                3.05
   CO   MASS (GRAMS)                               20.84
   CO2  MASS (GRAMS)                             1016.87
   NOX  MASS (GRAMS)                               12.49
   SO2  MASS (GRAMS)                                0.00

HC   GRAMS/KILOMETRE       .19
CO   GRAMS/KILOMETRE      1.27
CO2  GRAMS/KILOMETRE     61.78
NOX  GRAMS/KILOMETRE       .76
SO2  GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL   9.12    HC   GRAMS/MIN     .24
CO   GRAMS/KG OF FUEL   62.5    CO   GRAMS/MIN     1.6
CO2  GRAMS/KG OF FUEL   3042    CO2  GRAMS/MIN      79
NOX  GRAMS/KG OF FUEL  37.36    NOX  GRAMS/MIN     .97
SO2  GRAMS/KG OF FUEL   0.00    SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                      36.18  KILOMETRES/LITRE
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                 TABLE                  VEHICLE EMISSION RESULTS
                                   1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  400         TEST NO. 2        DATE  8/15/77                     MFGR. CODE    -0                   YR.  1976
VEHICLE MODEL  CB360 TRMAL+AIR + RICH   ENGINE     .36 LITRE 2             CURB WT.      0 KG                GVW      0 KG

BAROMETER 742.70 MM OF HG.                                          WET BULB TEMP  21.7 DEG. C
DRY BULB TEMP.   28.3 DEG. C                                        ABS. HUMIDITY  13.7 GRAMS/KG
REL. HUMIDITY     56 PCT.                                           DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                    BLOWER INLET PRESS., G1 711.2 MM. H2O
    BLOWER DIF. PRESS., G2, 812.8 MM. H2O                           BLOWER INLET TEMP.   43 DEG. C
    BAG RESULTS
    BAG NO.                                    1               2               3
    BLOWER REVOLUTIONS                      7170           11957            6931
    ROLL COUNTS                             3501            3758            3498
    HC   SAMPLE  METER READING/SCALE      18.3/3          45.4/2          82.6/2
    HC   SAMPLE  PPM                         183              45              83
    HC   BACKGRD METER READING/SCALE       1.5/3           1.6/3          12.9/2
    HC   BACKGRD PPM                          15              16              13
    CO   SAMPLE  METER READING/SCALE      23.3/3          86.8/*          87.9/*
    CO   SAMPLE  PPM                         540             205             427
    CO   BACKGRD METER READING/SCALE        .1/3            .1/3           2.8/*
    CO   BACKGRD PPM                           2               2               5
    CO2  SAMPLE  METER READING/SCALE      31.7/3          25.2/3          29.4/3
    CO2  SAMPLE  PERCENT                     .53             .41             .48
    CO2  BACKGRD METER READING/SCALE       3.7/3           3.9/3           3.8/3
    CO2  BACKGRD PERCENT                     .06             .06             .06
    NOX  SAMPLE  METER READING/SCALE      26.3/2           6.0/2          31.0/2
    NOX  SAMPLE  PPM                        26.3             6.0            31.0
    NOX  BACKGRD METER READING/SCALE       1.0/2            .8/2            .8/2
    NOX  BACKGRD PPM                         1.0              .8              .8
    SO2  SAMPLE  METER READING/SCALE      -0.0/*          -0.0/*          -0.0/*
    SO2  SAMPLE  PPM                         0.0             0.0             0.0
    SO2  BACKGRD METER READING/SCALE      -0.0/*          -0.0/*          -0.0/*
    SO2  BACKGRD PPM                         0.0             0.0             0.0

    HC   CONCENTRATION PPM                   169              30              70
    CO   CONCENTRATION PPM                   523             198             411
    CO2  CONCENTRATION PCT                   .47             .35             .43
    NOX  CONCENTRATION PPM                  25.3             5.2            30.2
    SO2  CONCENTRATION PPM                   0.0             0.0             0.0
    HC   MASS GRAMS                         4.85            1.44            1.95
    CO   MASS GRAMS                        30.36           19.18           23.09
    CO2  MASS GRAMS                       433.09          540.55          380.57
    NOX  MASS GRAMS                         2.69             .92            3.10
    SO2  MASS GRAMS                         0.00            0.00            0.00
    TOTAL CARBON GRAMS                    135.41          156.99          115.96

    WEIGHTED MASS HC        .38 GRAMS/KILOMETRE
    WEIGHTED MASS CO       3.76 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     78.23 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .32 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.07 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  27.5  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              407.86 GRAMS
    ESTIMATED FUEL WEIGHT =   .47KG.
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TABLE      EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                     VEHICLE NUMBER 400

DATE  8/15/77               TIME     -0 HRS.           TEST NO.  2
MODEL  1976 HONDA CB360 FET    THERMAL+AIR + RICH  ENGINE  .4 LITRE  2
DRIVER   KN                 TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  22 C         DRY BULB TEMP  29 C    REL. HUM.  53.0 PCT
SPEC. HUM.  13.5 GRAM/KG   BARO.  740.7 MM  HG.   MEASURED FUEL  0.00 KG

  RUN DURATION          12.73 MINUTES
  BLOWER INLET PRESS.  736.6  MM. H2O
  BLOWER DIF.  PRESS.  812.8  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9844
  DISTANCE TRAVELED   16.45  KILOMETRES
  BLOWER REVOLUTIONS     10516
  BLOWER CU. CM /REV.  8267

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              78.4/2
   HC   SAMPLE  PPM                                78
   HC   BACKGRD METER READING/SCALE              12.5/2
   HC   BACKGRD PPM                                13
   CO   SAMPLE  METER READING/SCALE              71.6/*
   CO   SAMPLE  PPM                               309
   CO   BACKGRD METER READING/SCALE                .9/*
   CO   BACKGRD PPM                                 3
   CO2  SAMPLE  METER READING/SCALE              45.5/3
   CO2  SAMPLE  PERCENT                            .78
   CO2  BACKGRD METER READING/SCALE               3.2/3
   CO2  BACKGRD PERCENT                            .05
   NOX  SAMPLE  METER READING/SCALE              92.0/2
   NOX  SAMPLE  PPM                              92.0
   NOX  BACKGRD METER READING/SCALE               1.2/2
   NOX  BACKGRD PPM                               1.2
   HC   CONCENTRATION PPM                          67
   CO   CONCENTRATION PPM                         296
   CO2  CONCENTRATION PCT                         .74
   NOX  CONCENTRATION PPM                        90.9
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                             2.80
   CO   MASS (GRAMS)                            25.09
   CO2  MASS (GRAMS)                           983.21
   NOX  MASS (GRAMS)                            13.94
   SO2  MASS (GRAMS)                             0.00

 HC   GRAMS/KILOMETRE        .17
 CO   GRAMS/KILOMETRE       1.53
 CO2  GRAMS/KILOMETRE      59.78
 NOX  GRAMS/KILOMETRE        .85
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL   8.59     HC   GRAMS/MIN     .22
 CO   GRAMS/KG OF FUEL   77.1     CO   GRAMS/MIN     2.0
 CO2  GRAMS/KG OF FUEL   3021     CO2  GRAMS/MIN      77
 NOX  GRAMS/KG OF FUEL  42.83     NOX  GRAMS/MIN    1.09
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                      37.12  KILOMETRES/LITRE
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                    TABLE                         VEHICLE EMISSION RESULTS
                                            1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  400      TEST NO. 1          DATE  8/30/77                       MFGR. CODE    -0                YR.  1976
VEHICLE MODEL  C8360 ST. CARB+CAT + AIR  ENGINE    .36 LITRE 2              CURB WT.      0 KG             GVW      0 KG

BAROMETER 740.41 MM OF HG.                                                 WET BULB TEMP  20.6 DEG. C
DRY BULB TEMP.    27.2 DEG. C                                              ABS. HUMIDITY  12.7 GRAMS/KG
REL. HUMIDITY      55 PCT.                                                 DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                           BLOWER INLET PRESS., G1 736.6 MM. H2O
   BLOWER DIF. PRESS., G2, 812.8 MM. H2O                                   BLOWER INLET TEMP.    43 DEG. C
   BAG RESULTS
   BAG NO.                                      1             2             3
   BLOWER REVOLUTIONS                         6985         11998          6968
   ROLL COUNTS                                 3449          3792          3485
   HC   SAMPLE  METER READING/SCALE           19.9/3        46.8/2        60.1/2
   HC   SAMPLE  PPM                            199            47            60
   HC   BACKGRD METER READING/SCALE            2.1/3        18.6/2        15.8/2
   HC   BACKGRD PPM                             21            19            16
   CO   SAMPLE  METER READING/SCALE           29.3/3        74.8/*        94.2/*
   CO   SAMPLE  PPM                            689           330           483
   CO   BACKGRD METER READING/SCALE            .5/3          2.8/*         2.2/*
   CO   BACKGRD PPM                             11             9             7
   CO2  SAMPLE  METER READING/SCALE           41.3/3        31.4/3        36.6/3
   CO2  SAMPLE  PERCENT                        .70           .52           .61
   CO2  BACKGRD METER READING/SCALE            3.5/3         3.4/3         3.6/3
   CO2  BACKGRD PERCENT                        .05           .05           .06
   NOX  SAMPLE  METER READING/SCALE           14.0/2         3.9/2        10.1/2
   NOX  SAMPLE  PPM                           14.0           3.9          10.1
   NOX  BACKGRD METER READING/SCALE            2.8/2         2.7/2         2.1/2
   NOX  BACKGRD PPM                            2.8           2.7           2.1
   SO2  SAMPLE  METER READING/SCALE           -0.0/*        -0.0/*        -0.0/*
   SO2  SAMPLE  PPM                            0.0           0.0           0.0
   SO2  BACKGRD METER READING/SCALE           -0.0/*        -0.0/*        -0.0/*
   SO2  BACKGRD PPM                            0.0           0.0           0.0

   HC   CONCENTRATION PPM                      179            29            45
   CO   CONCENTRATION PPM                      657           313           462
   CO2  CONCENTRATION PCT                      .65           .47           .56
   NOX  CONCENTRATION PPM                     11.4           1.3           8.1
   SO2  CONCENTRATION PPM                      0.0           0.0           0.0
   HC   MASS GRAMS                            4.99          1.39          1.25
   CO   MASS GRAMS                           36.97         30.19         25.92
   CO2  MASS GRAMS                          578.59        718.28        498.73
   NOX  MASS GRAMS                            1.12           .22           .80
   SO2  MASS GRAMS                            0.00          0.00          0.00
   TOTAL CARBON GRAMS                       178.07        210.18        148.20

   WEIGHTED MASS HC       .35 GRAMS/KILOMETRE
   WEIGHTED MASS CO      5.04 GRAMS/KILOMETRE
   WEIGHTED MASS CO2   103.65 GRAMS/KILOMETRE
   WEIGHTED MASS NOX      .10 GRAMS/KILOMETRE
   WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE      12.07 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  20.8  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST             536.45 GRAMS
   ESTIMATED FUEL WEIGHT =    .62KG.
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     TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 400

DATE  8/30/77              TIME     -0 HRS.          TEST NO.  1
MODEL  1976 HONDA CB360 FET ST.CARB+CAT+AIR          ENGINE  .4 LITRE  2
DRIVER   KM                TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  21 C        DRY BULB TEMP  27 C       REL. HUM.  54.7 PCT
SPEC. HUM.  12.7 GRAM/KG   BARO.  740.4 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION          12.77 MINUTES
  BLOWER INLET PRESS.  736.6  MM. H2O
  BLOWER DIF.  PRESS.  812.8  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10077
  DISTANCE TRAVELED    16.75  KILOMETRES
  BLOWER REVOLUTIONS     10542
  BLOWER CU. CM /REV.  8267

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                 49.8/2
   HC  SAMPLE  PPM                                   50
   HC  BACKGRD METER READING/SCALE                 14.0/2
   HC  BACKGRD PPM                                   14
   CO  SAMPLE  METER READING/SCALE                 36.0/3
   CO  SAMPLE  PPM                                  859
   CO  BACKGRD METER READING/SCALE                   .5/3
   CO  BACKGRD PPM                                   11
   CO2 SAMPLE  METER READING/SCALE                 60.0/3
   CO2 SAMPLE  PERCENT                             1.06
   CO2 BACKGRD METER READING/SCALE                  4.1/3
   CO2 BACKGRD PERCENT                              .06
   NOX SAMPLE  METER READING/SCALE                 23.3/2
   NOX SAMPLE  PPM                                 23.3
   NOX BACKGRD METER READING/SCALE                  2.4/2
   NOX BACKGRD PPM                                  2.4
   HC  CONCENTRATION PPM                             37
   CO  CONCENTRATION PPM                            817
   CO2 CONCENTRATION PCT                           1.01
   NOX CONCENTRATION PPM                           21.1
   SO2 COCENTRATION PPM                             0.0
   HC  MASS (GRAMS)                                1.56
   CO  MASS (GRAMS)                               69.33
   CO2 MASS (GRAMS)                             1347.58
   NOX MASS (GRAMS)                                3.15
   SO2 MASS (GRAMS)                                0.00

HC  GRAMS/KILOMETRE       .09
CO  GRAMS/KILOMETRE      4.14
CO2 GRAMS/KILOMETRE     80.45
NOX GRAMS/KILOMETRE       .19
SO2 GRAMS/KILOMETRE      0.00

HC  GRAMS/KG OF FUEL   3.37      HC  GRAMS/MIN     .12
CO  GRAMS/KG OF FUEL  150.3      CO  GRAMS/MIN     5.4
CO2 GRAMS/KG OF FUEL   2922      CO2 GRAMS/MIN     106
NOX GRAMS/KG OF FUEL   6.82      NOX GRAMS/MIN     .25
SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                      26.69  KILOMETRES/LITRE
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                    TABLE                          VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  400       TEST NO. 2         DATE  3/31/77
VEHICLE MODEL  CB360 ST.CARB+CAT + AIR  ENGINE    .36 LITRE 2          MFGR. CODE   -0                YR.  1976
                                                                       CURB WT.      0 KG             GVM     0 KG
BAROMETER 739.39 MM OF HG.
DRY BULB TEMP.    27.8 DEG. C                                        WET BULB TEMP  21.1 DEG. C
REL. HUMIDITY       55 PCT.                                          ABS. HUMIDITY  13.2 GRAMS/KG
                                                                     DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 812.8 MM. H2O                            BLOWER INLET PRESS., G1 736.6 MM. H2O
    BAG RESULTS                                                      BLOWER INLET TEMP.   43 DEG. C
    BAG NO.                                     1             2            3
    BLOWER REVOLUTIONS                       6980         11987         6972
    ROLL COUNTS                              3525          3830         3526
    HC   SAMPLE  METER READING/SCALE       16.3/3        47.1/2       66.6/2
    HC   SAMPLE  PPM                          163            47           67
    HC   BACKGRD METER READING/SCALE        2.1/3        18.3/2       15.9/2
    HC   BACKGRD PPM                           21            18           16
    CO   SAMPLE  METER READING/SCALE       28.3/3        82.9/*       24.5/3
    CO   SAMPLE  PPM                          664           384          569
    CO   BACKGRD METER READING/SCALE         .4/3         2.5/*         .2/3
    CO   BACKGRD PPM                            9             8            4
    CO2  SAMPLE  METER READING/SCALE       44.5/3        39.1/3       39.8/3
    CO2  SAMPLE  PERCENT                      .76           .57          .67
    CO2  BACKGRD METER READING/SCALE        4.7/3         4.9/3        5.2/3
    CO2  BACKGRD PERCENT                      .07           .08          .08
    NOX  SAMPLE  METER READING/SCALE       13.6/2         9.7/2       11.8/2
    NOX  SAMPLE  PPM                         13.6           9.7         11.8
    NOX  BACKGRD METER READING/SCALE        2.0/2         2.4/2        3.3/2
    NOX  BACKGRD PPM                          2.0           2.4          3.3
    SO2  SAMPLE  METER READING/SCALE       -0.0/*        -0.0/*       -0.0/*
    SO2  SAMPLE  PPM                          0.0           0.0          0.0
    SO2  BACKGRD METER READING/SCALE       -0.0/*        -0.0/*       -0.0/*
    SO2  BACKGRD PPM                          0.0           0.0          0.0

    HC   CONCENTRATION PPM                    143            30           52
    CO   CONCENTRATION PPM                    634           366          548
    CO2  CONCENTRATION PCT                    .69           .50          .60
    NOX  CONCENTRATION PPM                   11.7           2.4          8.7
    SO2  CONCENTRATION PPM                    0.0           0.0          0.0
    HC   MASS GRAMS                          3.98          1.41         1.43
    CO   MASS GRAMS                         35.58         35.23        30.69
    CO2  MASS GRAMS                        615.17        756.76       529.43
    NOX  MASS GRAMS                          1.18           .42          .87
    SO2  MASS GRAMS                          0.00          0.00         0.00
    TOTAL CARBON GRAMS                     186.60        222.86       158.89

    WEIGHTED MASS HC       .32 GRAMS/KILOMETRE
    WEIGHTED MASS CO      5.56 GRAMS/KILOMETRE
    WEIGHTED MASS CO2   108.21 GRAMS/KILOMETRE
    WEIGHTED MASS NOX      .12 GRAMS/KILOMETRE
    WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        12.23 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  19.9  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST                 568.35 GRAMS
    ESTIMATED FUEL WEIGHT =   .66KG.
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        TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 400

    DATE  8/31/77                  TIME     -0 HRS.           TEST NO.  2
    MODEL  1976 HONDA CB360 FET ST. CARB+CAT+AIR              ENGINE  .4 LITRE  2
    DRIVER   KN                    TEST WT.      0 KG.        GVW    0 KG
    WET BULB TEMP  21 C            DRY BULB TEMP  28 C        REL. HUM.  52.0 PCT
    SPEC. HUM.  12.5 GRAM/KG       BARO.  739.1 MM  HG.       MEASURED FUEL  0.00 KG

      RUN DURATION            12.76 MINUTES
      BLOWER INLET PRESS.  736.6  MM. H20
      BLOWER DIF.  PRESS.  812.8  MM  H20
      BLOWER INLET TEMP.      43  DEG. C
      DYNO REVOLUTIONS     10030
      DISTANCE TRAVELED    16.67  KILOMETRES
      BLOWER REVOLUTIONS     10537
      BLOWER CU. CM /REV.  8265

      BAG RESULTS
       HC   SAMPLE  METER READING/SCALE               59.7/2
       HC   SAMPLE  PPM                                 55
       HC   BACKGRD METER READING/SCALE               15.6/2
       HC   BACKGRD PPM                                 16
       CO   SAMPLE  METER READING/SCALE               40.2/3
       CO   SAMPLE  PPM                                968
       CO   BACKGRD METER READING/SCALE                 .5/3
       CO   BACKGRD PPM                                 11
       CO2  SAMPLE  METER READING/SCALE               58.7/3
       CO2  SAMPLE  PERCENT                           1.04
       CO2  BACKGRD METER READING/SCALE                3.3/3
       CO2  BACKGRD PERCENT                            .05
       NOX  SAMPLE  METER READING/SCALE               23.3/2
       NOX  SAMPLE  PPM                               23.3
       NOX  BACKGRD METER READING/SCALE                2.7/2
       NOX  BACKGRD PPM                                2.7
       HC   CONCENTRATION PPM                           40
       CO   CONCENTRATION PPM                          923
       CO2  CONCENTRATION PCT                          .99
       NOX  CONCENTRATION PPM                         20.8
       SO2  COCENTRATION PPM                           0.0
       HC   MASS (GRAMS)                              1.64
       CO   MASS (GRAMS)                             78.14
       CO2  MASS (GRAMS)                           1324.74
       NOX  MASS (GRAMS)                              3.07
       SO2  MASS (GRAMS)                              0.00

    HC   GRAMS/KILOMETRE       .10
    CO   GRAMS/KILOMETRE      4.69
    CO2  GRAMS/KILOMETRE     79.46
    NOX  GRAMS/KILOMETRE       .18
    SO2  GRAMS/KILOMETRE      0.00

    HC   GRAMS/KG OF FUEL   3.70      HC   GRAMS/MIN     .13
    CO   GRAMS/KG OF FUEL  170.5      CO   GRAMS/MIN     6.1
    CO2  GRAMS/KC OF FUEL   2890      CO2  GRAMS/MIN     104
    NOX  GRAMS/KG OF FUEL   6.70      NOX  GRAMS/MIN     .24
    SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN    0.00
    CARBON BALANCE FUEL ECONOMY                       26.72  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KZ 900

Date 12/07/76 Sequence Baseline KZS-1

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1000	0	1.68	6.33	10.0	25.	9,760
20	2	2400	.49	5.68	8.06	4.6	67.	7,760
30	3	2800	1.08	5.56	8.75	3.5	129.	4,670
40	4	3050	2.05	4.94	9.98	3.5	345.	3,680
50	5	3400	3.30	4.91	10.60	2.8	350.	3.980
60	5	4050	4.74	4.67	10.99	2.3	790.	3.070
0	N	1000	0	2.21	6.25	9.2	29.	9,680

Notes: Vacuum set: Outside 9.7 in. Hg
Inside 9.0 in. Hg

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE KZ-900

Date 1/13/77 Sequence Baseline Check-Out, KZS-1a

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1000	----	1.60	6.76	8.0	23.	12,000
40	4	3000	2.07	4.61	10.12	3.6	265.	3,920
60	5	4000	4.80	5.10	10.55	2.5	485.	3,360

Notes: Settings - Pilot air screw: stock
Jet needle position: stock - center
Spark plugs gapped: stock .028-.032 inch (0.7-0.8 mm)
Carb. vac. from L to R 10.5, 7.4, 9.0, 8 in. Hg

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE KZ-900

Date 1/17/77 Sequence 1st Lean Adjustment, KZS-2

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1000	----	0.47	6.09	12.0	27.	13,600
20	2	2500	0.45	3.53	9.08	5.3	81.	4,800
30	3	2800	1.08	3.43	10.01	4.3	150.	2,680
40	4	3050	2.06	3.53	10.55	3.4	280.	2,880
50	5	3400	3.27	1.62	12.02	3.0	1430.	2,400
60	5	4050	4.73	0.94	12.62	2.5	1500.	1,200
Idle	N	1000	----	0.70	6.33	11.1	36.	9,120

Notes: Settings - Pilot air screw: out half turn from stock
Jet needle clip position: up 1 notch from stock
Max. head temp. at 60 mph: 200°C, max. gas temp. at station #1, 775°C
Ambient Temperature: 70° ± 2°
WOT time: 5.03 sec ± 0.10 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE KZ-900

Date 1/18/77 Sequence 1st Lean Adjustment + CDI, KZS-3

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1000	----	0.32	4.78	14.0	19.	11,400
30	3	2800	1.11	2.45	9.18	5.4	145.	2,240
60	5	4050	4.80	0.76	11.79	4.2	1625.	1,160
Idle	N	1000	----	0.53	4.49	13.6	21.	8,560

Notes: Settings - Same as above but spark plugs gapped to .045" for CDI system
Temperature not taken
Carburetor vac. from L to R: 10, 8.7, 8.7, 7.4 in. Hg
WOT time: 5.15 ± 0.10 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE KZ-900

Date 1/18/77 Sequence 2nd Lean Adjustment + CDI, KZS-4

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1000	----	0.12	4.21	14.6	39.	13,600
20	2	2400	0.45	1.06	9.18	7.5	120.	4,400
30	3	2800	1.09	0.35	9.91	7.1	315.	1,440
40	4	3050	2.08	0.24	10.44	6.5	660.	960
50	5	3400	3.28	0.24	10.44	6.8	1025.	1,200
60	5	4050	4.80	0.21	10.77	6.0	900.	440
Idle	N	1100	----	0.12	4.78	13.6	44.	10,240

Notes: Settings - Pilot air screw out one and a half turns from stock
Jet needle clip position: top notch position
Idles rough, max. head temp at 60 mph - 190°C, max. gas temp. @ station #1, 750°C
WOT time: 5.35 sec ± 0.10 sec
Motorcycle would not negotiate LA-4 cold start, excessive use of choke needed
Throttle movement would not produce results - tendency to over and under shoot trace
Pilot air screw too far out - lean

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE KZ-900

Date 1/19/77 Sequence 2nd Lean Adjustment + CDI, KZS-5

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1500	----	0.88	6.53	10.1	40.	14,800
30	3	2700	1.13	1.95	9.80	6.4	175.	2,560
60	5	4000	4.87	0.24	11.33	5.5	1160.	880

Notes: Settings - Pilot air screw: out one half turn out from stock
Jet needle clip position: top notch position
Carb. vac. checked after run: right out carb. vac. was readjusted from 4 to 7 in Hg gage
Quality of idle improved after carb. adjust.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE KZ-900

Date 1/19/77 Sequence 2nd Lean Adjustment + CDI, KZS-6

Conditon				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1000	----	0.21	6.88	11.4	43.	10,500	
20	2	2450	0.52	0.32	9.39	8.1	160.	4,800	
30	3	2600	1.17	0.76	10.22	6.5	270.	1,600	
40	4	3000	2.11	0.23	10.55	6.3	690.	1,280	
50	5	3450	3.44	0.24	10.35	6.6	910.	1,600	
60	5	4000	4.99	0.23	11.05	5.8	1030.	608	
Idle	N	2050	----	1.75	8.11	8.3	50.	9,600	
Idle	N	1000	----	0.18	5.22	13.3	32.	10,000	idle speed readjusted

Notes: Setting - Pilot air screw: out one turn from stock
Jet needle clip position: top notch
Max. head temp. at 60 mph -, max. gas temp. - 750°C
Inside exhaust temp. runs cooler than outside exhaust temp. - typical at idle but not other speeds
Pilot air screws: from R to L, 2-1/2, 3, 2-7/8, 2-3/4
Test #1 - FTP and FET were run at this setting - did not perform very well on dyno- too lean, excessive use of choke was necessary

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE KZ-900

Date 1/24/77 Sequence 3rd Lean Adjustment + CDI, KZS-7

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1000	----	1.24	6.25	11.2	22.	7,760
20	2	2500	0.46	4.35	8.39	5.8	65.	3,920
30	3	2800	1.12	3.36	9.70	4.9	145.	2,720
40	4	3100	2.09	2.75	10.77	4.2	390.	2,720
50	5	3400	3.33	0.91	12.02	3.9	1690.	2,160
60	5	4050	4.80	0.24	12.26	4.1	1580.	620
Idle	N	1000	----	1.85	6.01	11.1	25.	6,800

Notes: Settings - Pilot air screws: all two turns out from bottom
clip position: top notch
Max. head temp. at 60 mph, approx. 200°C; max. gas temp. at 60 mph, approx. 750°C
Motorcycle performance was acceptable on dyno
Pilot air screws were adjusted out another 1/4 turn
Dyno performance was OK - borderline limit, FTP and FET tests No. 2 first step were run

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KZ-900

Date 3/11/77 Sequence Final Lean Adjustment + CDI, KZS-8

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO$_2$, %	O$_2$, %	NO, ppm	FID HC, ppm C
Idle	N	1200	-	2.41	7.92	8.8	32	4,640
20	2	2400	0.56	5.88	8.30	5.2	57	4,320
30	3	2800	1.19	5.00	9.49	4.0	112	2,880
40	4	3100	2.12	3.91	10.88	3.3	375	2,760
50	5	3450	3.31	1.30	12.55	3.1	650	2,000
60	5	4100	4.78	0.24	12.82	3.8	1440	400
Idle	N	1200	-	3.00	8.03	7.8	37	3,760

Notes: Run after FTP's and FET's with final "borderline" limit adjustments
Pilot Air Screws: out 1 3/4 turns, vacuum from L to R: 9.2, 8.6, 8.6, 9.2 in. Hg.
Max. head temp at 60 mph 190°C, Max gas temp - station #1 at 60 mph - 755°C
W.O.T. accel time 0-100 kph, 5.5 sec
Jet Needle clip position: top

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KZ-900

Date 3/30/77 Sequence KZS-9 + reed valves

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO$_2$, %	O$_2$, %	NO, ppm	FID HC, ppm C	
Idle	N	1000	----	1.43	5.20	12.8	11.	4,960	
20	2	2400	0.57	3.72	7.37	8.0	43.	3,072	
30	3	2800	1.24	4.02	8.11	6.9	80.	2,560	
40	4	3100	2.19	1.91	9.80	6.3	380.	1,780	dilution
50	5	3400	3.48	0.47	10.77	6.0	1175.	960	
60	5	4100	4.99	0.21	11.22	5.9	1340.	300	
Idle	N	1200	----	2.05	5.61	11.5	18.	2,560	

Notes: run with chevette reed valves - pipes insulated
max. head temp. at 60 mph - 180°C
max. gas temp. at 60 mph - 775 °C

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KZ-900

Date 5/30/77 Sequence KZS-10

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1000	----	0.70	5.74	12.4	16.	3,360	reaction implied by temp. at sta. 4 being higher than sta. 3
20	2	2400	0.50	1.59	8.34	8.5	14.	780	
30	3	2800	1.17	1.33	8.95	8.0	40.	640	
40	4	3100	2.17	0.90	9.52	7.5	245.	580	
50	5	3400	3.38	0.26	9.70	7.8	765.	600	dilution only
60	5	4050	4.81	0.13	10.25	7.3	965.	320	
Idle	N	1000	----	0.71	5.73	11.8	16.	3,140	

Notes: Gast Pump. 0440 installed with 1.07:1 drive, pipes insulated
Max. head temp. 160°C, carburetors leaned as with KZS-8
Max. exhaust gas temp. 740°C
WOT accel time 0 - 100 kph = 5.4 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KZ-900

Date 6/09/77 Sequence KZS-11

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1200	----	0.94	6.50	10.5	17.	1,170	no confirmation of reaction occurring-dilution only
20	2	2500	0.52	1.30	8.11	8.2	37	912	
30	3	2800	1.19	1.40	8.72	7.6	73.	650	
40	4	3050	2.16	0.65	9.08	7.6	370.	680	
50	5	3450	3.40	0.24	9.28	7.8	570.	1,080	
60	5	4025	4.80	0.21	10.01	6.9	785.	344	
Idle	N	1250	----	0.82	7.02	9.9	27.	720	

Notes: Gast pump No. 0440 installed - port liners installed
Max. Head temp. 155°C, carburetor leaned as with KZS-8
Max. exhaust gas temp. 740°C at 60 mph
W.O.T. accel time 0-100 kph = 5.9 sec.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KZ 900

Date 8/3/77 Sequence KZS-12

Condition				Concentrations						
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C		
Idle	N	1000	--	0.91	5.07	12.8	12.	2,040		
20	2	2400	0.52	1.67	8.27	8.2	10.	650	possible reaction	
30	3	2800	1.21	1.36	9.00	7.5	34.	480	indicated by	dilut
40	4	3000	2.16	0.90	9.32	7.3	210.	456	temperature data	
50	5	3400	3.39	0.34	9.70	7.3	685.	472		
60	5	4000	4.90	0.24	10.12	6.8	1110.	296		
Idle	N	1000	--	1.03	4.90	11.5	14.	1,800		

Notes: Lean Carburetor: after vacuum alignment + CDI + Air Injection + Port Liners
Max. head temp. 190°C
Max. exhaust gas temp. at station #1 = 740°C
W.O.T. 0-100 kph accel time = 5.6 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KZ-900

Date 8/08/77 Sequence KZS-13

Condition				Concentrations					Exh. Temp., °C		Air Injection Rate, cfm
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Enter Cat.	Exit Cat.	
Idle	N	1000	----	0.004	6.84	11.3	18.	184	200	425	1.00
20	2	2400	0.51	0.055	11.70	5.3	29.	220	310	500	2.45
30	3	2700	1.19	0.008	12.14	4.5	55.	122	350	540	2.97
40	4	3000	2.17	0.008	12.14	4.6	215.	152	350	500	3.27
50	5	3350	3.37	0.010	11.22	6.1	435.	104	375	390	3.49
60	5	4000	4.80	0.012	11.22	6.2	548.	92	430	400	4.25
Idle	N	1000	----	0.008	7.50	10.3	21.	204	205	385	1.00

Notes: Lean carburetion, CDI, port liners, (2) catalyst PTX 413 + Air, Pump No. 440 at 0.6
Max. Exhaust temp at station # 1 - 750°C at 60 mph
Max. head temp - 185°C at 60 mph
W.O.T. 0-100 kph acceleration time 5.5 sec.

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                     TABLE                              VEHICLE EMISSION RESULTS
                                                   1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800        TEST NO. 1       DATE 10/ 7/76                          MFGR. CODE   -0                    YR.  1976
VEHICLE MODEL  KAWASAKI K2 900        ENGINE    .89 LITRE 4                  CURB WT.      0 KG                 GVM      0 KG

BAROMETER 742.44 MM OF HG.                                           WET BULB TEMP  16.7 DEG. C
DRY BULB TEMP.   25.6 DEG. C                                         ABS. HUMIDITY   8.3 GRAMS/KG
REL. HUMIDITY    40 PCT.                                             DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, *90.7 MM. H2O                            BLOWER INLET PRESS., G1 *00.2 MM. H2O
    BAG RESULTS                                                      BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                         1              2              3
    BLOWER REVOLUTIONS                          10434          17737          10368
    ROLL COUNTS                                  3462           3709           3458
    HC   SAMPLE  METER READING/SCALE           11.9/4          3.4/4         34.0/3
    HC   SAMPLE  PPM                             1190            340            340
    HC   BACKGRD METER READING/SCALE             .4/4           .6/4           .5/4
    HC   BACKGRD PPM                               40             60             50
    CO   SAMPLE  METER READING/SCALE           76.3/3         68.0/3         81.7/3
    CO   SAMPLE  PPM                             2033           1757           2231
    CO   BACKGRD METER READING/SCALE            1.0/3          1.1/3          1.1/3
    CO   BACKGRD PPM                               22             24             24
    CO2  SAMPLE  METER READING/SCALE           28.7/3         18.6/3         21.9/3
    CO2  SAMPLE  PERCENT                          .47            .30            .35
    CO2  BACKGRD METER READING/SCALE            2.6/3          2.3/3          1.5/3
    CO2  BACKGRD PERCENT                          .04            .04            .02
    NOX  SAMPLE  METER READING/SCALE           14.0/2          3.5/2          9.3/2
    NOX  SAMPLE  PPM                             14.0            3.5            9.3
    NOX  BACKGRD METER READING/SCALE            1.2/2           .9/2          1.0/2
    NOX  BACKGRD PPM                              1.2             .9            1.0
    SO2  SAMPLE  METER READING/SCALE           -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                              0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE           -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                              0.0            0.0            0.0

    HC   CONCENTRATION PPM                       1152            282            292
    CO   CONCENTRATION PPM                       1968           1702           2165
    CO2  CONCENTRATION PCT                        .44            .26            .33
    NOX  CONCENTRATION PPM                       12.9            2.6            8.3
    SO2  CONCENTRATION PPM                        0.0            0.0            0.0
    HC   MASS GRAMS                             40.38          16.80          10.17
    CO   MASS GRAMS                            139.25         204.53         152.13
    CO2  MASS GRAMS                            486.21         501.43         368.78
    NOX  MASS GRAMS                              1.39            .48            .89
    SO2  MASS GRAMS                              0.00           0.00           0.00
    TOTAL CARBON GRAMS                         227.36         239.10         174.69

    WEIGHTED MASS HC       3.35 GRAMS/KILOMETRE
    WEIGHTED MASS CO      29.47 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     77.27 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .13 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.92 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  17.6  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              641.15 GRAMS
    FSTIMATED FUEL WEIGHT =   .74KG.
    TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMBER 800

DATE 10/ 6/76               TIME     -0 HRS.         TEST NO.  1
MODEL  1976 K2 900 KAWASAKIMIWAY CYCLE                ENGINE  .9 LITRE  4
DRIVER   TJ                 TEST WT.    141 KG.      GVW    0 KG
WET BULB TEMP  15 C         DRY BULB TEMP  26 C      REL. HUM.  30.7 PCT
SPEC. HUM.   6.4 GRAM/KG    BARO.  742.2 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION           12.75 MINUTES
  BLOWER INLET PRESS. 1600.2  MM. H2O
  BLOWER DIF.  PRESS. 1778.0  MM  H2O
  BLOWER INLET TEMP.     43  DEG. C
  DYNO REVOLUTIONS     9825
  DISTANCE TRAVELED   16.33  KILOMETRES
  BLOWER REVOLUTIONS    15673
  BLOWER CU. CM /REV.  7651

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE               27.1/3
   HC  SAMPLE  PPM                                271
   HC  BACKGRD METER READING/SCALE                1.3/3
   HC  BACKGRD PPM                                 13
   CO  SAMPLE  METER READING/SCALE               61.2/2
   CO  SAMPLE  PPM                               3140
   CO  BACKGRD METER READING/SCALE                 .4/2
   CO  BACKGRD PPM                                 15
   CO2 SAMPLE  METER READING/SCALE               38.1/3
   CO2 SAMPLE  PERCENT                            .64
   CO2 BACKGRD METER READING/SCALE                3.7/3
   CO2 BACKGRD PERCENT                            .06
   NOX SAMPLE  METER READING/SCALE               31.9/2
   NOX SAMPLE  PPM                               31.9
   NOX BACKGRD METER READING/SCALE                2.5/2
   NOX BACKGRD PPM                                2.5
   HC  CONCENTRATION PPM                          259
   CO  CONCENTRATION PPM                         3105
   CO2 CONCENTRATION PCT                          .59
   NOX CONCENTRATION PPM                         29.6
   SO2 COCENTRATION PPM                           0.0
   HC  MASS (GRAMS)                             13.63
   CO  MASS (GRAMS)                            330.01
   CO2 MASS (GRAMS)                            990.15
   NOX MASS (GRAMS)                              4.52
   SO2 MASS (GRAMS)                              0.00

 HC  GRAMS/KILOMETRE       .83
 CO  GRAMS/KILOMETRE     20.21
 CO2 GRAMS/KILOMETRE     60.63
 NOX GRAMS/KILOMETRE       .28
 SO2 GRAMS/KILOMETRE      0.00

 HC  GRAMS/KG OF FUEL  27.84      HC  GRAMS/MIN   1.07
 CO  GRAMS/KG OF FUEL  674.0      CO  GRAMS/MIN   25.9
 CO2 GRAMS/KG OF FUEL   2022      CO2 GRAMS/MIN     78
 NOX GRAMS/KG OF FUEL   9.23      NOX GRAMS/MIN    .35
 SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                  24.50  KILOMETRES/LITRE
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                        TABLE                           VEHICLE EMISSION RESULTS
                                                   1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800      TEST NO. 2            DATE 10/ 8/76                        MFGR. CODE    -0                    YR.  1976
VEHICLE MODEL  KAWASAKI KZ 900           ENGINE     .89 LITRE 4               CURB WT.      0 KG                  GVW      0 KG

BAROMETER 746,26 MM OF HG.                                                    WET BULB TEMP  15,0 DEG. C
DRY BULB TEMP.    25,0 DEG. C                                                 ABS. HUMIDITY    6,5 GRAMS/KG
REL. HUMIDITY      33 PCT.                                                    DYNO ROLL CONSTANT    967,97

EXHAUST EMISSIONS
                                                                              BLOWER INLET PRESS., G1 *00,2 MM, H2O
    BLOWER DIF. PRESS., G2, *78,0 MM, H2O                                     BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                       1                2                3
    BLOWER REVOLUTIONS                         10383            17805            10393
    ROLL COUNTS                                 3489             3737             3521
    HC   SAMPLE  METER READING/SCALE         10,4/4           31,1/3           28,4/3
    HC   SAMPLE  PPM                         1040              311              284
    HC   BACKGRD METER READING/SCALE          1,9/3            1,7/3            1,7/3
    HC   BACKGRD PPM                           19               17               17
    CO   SAMPLE  METER READING/SCALE         61,3/3           68,0/3           72,7/3
    CO   SAMPLE  PPM                         1552             1757             1910
    CO   BACKGRD METER READING/SCALE          1,2/3            1,8/3            1,2/3
    CO   BACKGRD PPM                           26               39               26
    CO2  SAMPLE  METER READING/SCALE         27,7/3           18,1/3           21,2/3
    CO2  SAMPLE  PERCENT                      ,45              ,29              ,34
    CO2  BACKGRD METER READING/SCALE          3,0/3            4,0/3            3,0/3
    CO2  BACKGRD PERCENT                      ,05              ,06              ,05
    NOX  SAMPLE  METER READING/SCALE         18,5/2            4,6/2           12,1/2
    NOX  SAMPLE  PPM                         18,5              4,6             12,1
    NOX  BACKGRD METER READING/SCALE          1,4/2            1,5/2            1,6/2
    NOX  BACKGRD PPM                          1,4              1,5              1,6
    SO2  SAMPLE  METER READING/SCALE         -0,0/*           -0,0/*           -0,0/*
    SO2  SAMPLE  PPM                          0,0              0,0              0,0
    SO2  BACKGRD METER READING/SCALE         -0,0/*           -0,0/*           -0,0/*
    SO2  BACKGRD PPM                          0,0              0,0              0,0

    HC   CONCENTRATION PPM                   1022              295              268
    CO   CONCENTRATION PPM                   1498             1691             1852
    CO2  CONCENTRATION PCT                    ,41              ,23              ,30
    NOX  CONCENTRATION PPM                   17,2              3,2             10,6
    SO2  CONCENTRATION PPM                    0,0              0,0              0,0
    HC   MASS GRAMS                         35,90            17,75             9,41
    CO   MASS GRAMS                        106,22           205,69           131,48
    CO2  MASS GRAMS                        460,81           442,49           339,15
    NOX  MASS GRAMS                          1,76             ,55             1,08
    SO2  MASS GRAMS                          0,00             0,00             0,00
    TOTAL CARBON GRAMS                     202,39           229,33           155,72

    WEIGHTED MASS HC        3,20 GRAMS/KILOMETRE
    WEIGHTED MASS CO       27,10 GRAMS/KILOMETRE
    WEIGHTED MASS CO2      69,02 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        ,16 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0,00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        12,04 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  19,4  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              582,44 GRAMS
    ESTIMATED FUEL WEIGHT =    ,62KG.
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     TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMBER 800

DATE 10/ 7/76                TIME    -0 HRS.          TEST NO.  2
MODEL  1976 KAWASAKI K2 900HIWAY CYCLE                ENGINE  .9 LITRE  4
DRIVER   TJ                  TEST WT.    191 KG.      GVW     0 KG
WET BULB TEMP  17 C          DRY BULB TEMP  26 C      REL. HUM.  43.0 PCT
SPEC. HUM.    9.0 GRAM/KG    BARO.  742.4 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION             12.75 MINUTES
  BLOWER INLET PRESS. 1600.2  MM. H2O
  BLOWER DIF.  PRESS. 1778.0  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9816
  DISTANCE TRAVELED   16.32  KILOMETRES
  BLOWER REVOLUTIONS    15523
  BLOWER CU. CM /REV.  7636

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                29.4/3
   HC   SAMPLE  PPM                                 294
   HC   BACKGRD METER READING/SCALE                 3.4/3
   HC   BACKGRD PPM                                  34
   CO   SAMPLE  METER READING/SCALE                61.5/2
   CO   SAMPLE  PPM                                3213
   CO   BACKGRD METER READING/SCALE                  .6/2
   CO   BACKGRD PPM                                  23
   CO2  SAMPLE  METER READING/SCALE                35.6/3
   CO2  SAMPLE  PERCENT                             .60
   CO2  BACKGRD METER READING/SCALE                 3.0/3
   CO2  BACKGRD PERCENT                             .05
   NOX  SAMPLE  METER READING/SCALE                25.9/2
   NOX  SAMPLE  PPM                                25.9
   NOX  BACKGRD METER READING/SCALE                 1.1/2
   NOX  BACKGRD PPM                                 1.1
   HC   CONCENTRATION PPM                           262
   CO   CONCENTRATION PPM                          3110
   CO2  CONCENTRATION PCT                           .55
   NOX  CONCENTRATION PPM                          24.9
   SO2  COCENTRATION PPM                            0.0
   HC   MASS (GRAMS)                              13.66
   CO   MASS (GRAMS)                             326.88
   CO2  MASS (GRAMS)                             919.45
   NOX  MASS (GRAMS)                               9.06
   SO2  MASS (GRAMS)                               0.00

 HC   GRAMS/KILOMETRE       .84
 CO   GRAMS/KILOMETRE     20.03
 CO2  GRAMS/KILOMETRE     56.35
 NOX  GRAMS/KILUMETRE       .25
 SO2  GRAMS/KILOMETRE      0.00

 HC   GRAMS/KG OF FUEL  29.32     HC   GRAMS/MIN    1.07
 CO   GRAMS/KG OF FUEL  701.7     CO   GRAMS/MIN    25.6
 CO2  GRAMS/KG OF FUEL   1974     CO2  GRAMS/MIN      72
 NOX  GRAMS/KG OF FUEL   8.72     NOX  GRAMS/MIN     .32
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY
                                             25.73  KILOMETRES/LITRE
                          TABLE                         VEHICLE EMISSION RESULTS
                                                   1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800        TEST NO. 1            DATE  1/20/77                         MFGR. CODE   -0                      YR.  1976
VEHICLE MODEL  KZ 900  1ST STEP, 2nd       ENGINE    .42 LITRE 4                 CURB WT.      0 KG                   GVW      0 KG
                                ADJUSTMENT
BAROMETER 747.52 MM OF HG.                                                  WET BULB TEMP  12.2 DEG. C
DRY BULB TEMP.    25.0 DEG. C                                               ABS. HUMIDITY   3.6 GRAMS/KG
REL. HUMIDITY     18 PCT.                                                   DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                            BLOWER INLET PRESS., G1 *24.0 MM. H2O
    BLOWER DIF. PRESS., G2, *01.8 MM. H2O                                   BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                          1                 2                 3
    BLOWER REVOLUTIONS                            10425             17818             10395
    ROLL COUNTS                                    3524              3825              3516
    HC    SAMPLE  METER READING/SCALE             18.6/4            34.9/3            21.6/3
    HC    SAMPLE  PPM                             1860               349               216
    HC    BACKGRD METER READING/SCALE              5.4/3            11.5/3             8.9/3
    HC    BACKGRD PPM                               54               115                89
    CO    SAMPLE  METER READING/SCALE             33.3/3            10.6/3            51.0/*
    CO    SAMPLE  PPM                              790               236               194
    CO    BACKGRD METER READING/SCALE               .3/3             0.0/3              .2/3
    CO    BACKGRD PPM                                6                 0                 4
    CO2   SAMPLE  METER READING/SCALE             35.0/3            22.9/3            31.6/3
    CO2   SAMPLE  PERCENT                          .59               .37               .52
    CO2   BACKGRD METER READING/SCALE              3.2/3             2.8/3             3.6/3
    CO2   BACKGRD PERCENT                          .05               .04               .06
    NOX   SAMPLE  METER READING/SCALE             26.2/2            11.0/2            32.8/2
    NOX   SAMPLE  PPM                             26.2              11.0              32.8
    NOX   BACKGRD METER READING/SCALE              1.2/2             1.2/2             1.2/2
    NOX   BACKGRD PPM                              1.2               1.2               1.2
    SO2   SAMPLE  METER READING/SCALE             -0.0/*            -0.0/*            -0.0/*
    SO2   SAMPLE  PPM                              0.0               0.0               0.0
    SO2   BACKGRD METER READING/SCALE             -0.0/*            -0.0/*            -0.0/*
    SO2   BACKGRD PPM                              0.0               0.0               0.0

    HC    CONCENTRATION PPM                       1809               238               131
    CO    CONCENTRATION PPM                        771               233               187
    CO2   CONCENTRATION PCT                        .54               .33               .47
    NOX   CONCENTRATION PPM                       25.1               9.8              31.7
    SO2   CONCENTRATION PPM                        0.0               0.0               0.0
    HC    MASS GRAMS                             67.63             15.18              4.87
    CO    MASS GRAMS                             58.15             30.11             14.04
    CO2   MASS GRAMS                            643.41            671.80            560.21
    NOX   MASS GRAMS                              2.52              1.69              3.17
    SO2   MASS GRAMS                              0.00              0.00              0.00
    TOTAL CARBON GRAMS                          259.08            209.40            163.13

    WEIGHTED MASS HC        3.85 GRAMS/KILOMETRE
    WEIGHTED MASS CO        5.17 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     103.85 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        .37 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        12.21 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  18.9  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              631.61 GRAMS
    ESTIMATED FUEL WEIGHT =    .73KG.
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     TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 800

DATE  1/20/77                   TIME     -0 HRS.           TEST NO.  1
MODEL  1976 KAWASAKI KZ-900FET  1ST STEP, 2nd ADJUST.ENGINE  .9 LITRE  4
DRIVER   KN                     TEST WT.      0 KG.        GVW     0 KG
WET BULB TEMP  13 C             DRY BULB TEMP  27 C        REL. HUM.  14.2 PCT
SPEC. HUM.   3.2 GRAM/KG        BARO.  747.5 MM  HG.      MEASURED FUEL  0.00 KG

 RUN DURATION           12.76 MINUTES
 BLOWER INLET PRESS. 1524.0  MM. H20
 BLOWER DIF.  PRESS. 1701.8  MM  H20
 BLOWER INLET TEMP.      43  DEG. C
 DYNO REVOLUTIONS     10050
 DISTANCE TRAVELED    16.71  KILOMETRES
 BLOWER REVOLUTIONS     15701
 BLOWER CU. CM /REV.   8027

 BAG RESULTS
  HC   SAMPLE  METER READING/SCALE                 15.5/3
  HC   SAMPLE  PPM                                  155
  HC   BACKGRD METER READING/SCALE                  3.4/3
  HC   BACKGRD PPM                                   34
  CO   SAMPLE  METER READING/SCALE                 44.6/*
  CO   SAMPLE  PPM                                  164
  CO   BACKGRD METER READING/SCALE                   .2/*
  CO   BACKGRD PPM                                    1
  CO2 SAMPLE  METER READING/SCALE                  51.0/3
  CO2 SAMPLE  PERCENT                                .89
  CO2 BACKGRD METER READING/SCALE                   3.5/3
  CO2 BACKGRD PERCENT                                .05
  NOX SAMPLE  METER READING/SCALE                  76.9/2
  NOX SAMPLE  PPM                                  76.9
  NOX BACKGRD METER READING/SCALE                    .8/2
  NOX BACKGRD PPM                                     .8
  HC   CONCENTRATION PPM                             123
  CO   CONCENTRATION PPM                             160
  CO2 CONCENTRATION PCT                              .89
  NOX CONCENTRATION PPM                             76.2
  SO2 COCENTRATION PPM                               0.0
  HC   MASS (GRAMS)                                 6.94
  CO   MASS (GRAMS)                                18.15
  CO2 MASS (GRAMS)                               1501.44
  NOX MASS (GRAMS)                                11.40
  SO2 MASS (GRAMS)                                  0.00

 HC   GRAMS/KILOMETRE        .42
 CO   GRAMS/KILOMETRE       1.09
 CO2 GRAMS/KILOMETRE       89.88
 NOX GRAMS/KILOMETRE         .68
 SO2 GRAMS/KILOMETRE        0.00

 HC   GRAMS/KG OF FUEL  14.18      HC   GRAMS/MIN     .54
 CO   GRAMS/KG OF FUEL   37.1      CO   GRAMS/MIN     1.4
 CO2 GRAMS/KG OF FUEL   3046      CO2 GRAMS/MIN     118
 NOX GRAMS/KG OF FUEL  23.28      NOX GRAMS/MIN     .89
 SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                    25.06  KILOMETRES/LITRE
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           TABLE                                  VEHICLE EMISSION RESULTS
                                            1975  LIGHT DUTY EMISSIONS TEST
UNIT NO. 800        TEST NO. 2            DATE  1/25/77                         MFGR. CODE    -0                      YR.  1976
VEHICLE MODEL  KZ900 1ST STEP, 3rd ADJUST. ENGINE    .9  LITRE 4                CURB WT.      0 KG                    GVW      0 KG

BAROMETER 746.00 MM OF HG.                                                     WET BULB TEMP  13.9 DEG. C
DRY BULB TEMP.    25.6 DEG. C                                                  ABS. HUMIDITY   5.1 GRAMS/KG
REL. HUMIDITY     25 PCT.                                                      DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                               BLOWER INLET PRESS., G1 *29.1 MM. H2O
    BLOWER DIF. PRESS., G2, *18.0 MM. H2O                                      BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                        1                  2                  3
    BLOWER REVOLUTIONS                           10351              17806              10387
    ROLL COUNTS                                   3510               3832               3526
    HC   SAMPLE  METER READING/SCALE             16.2/4             21.2/3             20.8/3
    HC   SAMPLE  PPM                              1620                212                208
    HC   BACKGRD METER READING/SCALE              3.9/3              3.7/3              2.9/3
    HC   BACKGRD PPM                                39                 37                 29
    CO   SAMPLE  METER READING/SCALE             39.8/3             30.2/3             20.3/3
    CO   SAMPLE  PPM                               958                711                466
    CO   BACKGRD METER READING/SCALE               .9/3               .6/3               .7/3
    CO   BACKGRD PPM                                19                 13                 15
    CO2  SAMPLE  METER READING/SCALE             34.0/3             23.0/3             30.3/3
    CO2  SAMPLE  PERCENT                           .57                .37                .50
    CO2  BACKGRD METER READING/SCALE              3.9/3              3.9/3              4.5/3
    CO2  BACKGRD PERCENT                           .06                .06                .07
    NOX  SAMPLE  METER READING/SCALE             28.8/2              8.2/2             33.1/2
    NOX  SAMPLE  PPM                              28.8                8.2               33.1
    NOX  BACKGRD METER READING/SCALE              1.5/2              1.0/2              1.1/2
    NOX  BACKGRD PPM                               1.5                1.0                1.1
    SO2  SAMPLE  METER READING/SCALE             -0.0/*             -0.0/*             -0.0/*
    SO2  SAMPLE  PPM                               0.0                0.0                0.0
    SO2  BACKGRD METER READING/SCALE             -0.0/*             -0.0/*             -0.0/*
    SO2  BACKGRD PPM                               0.0                0.0                0.0

    HC   CONCENTRATION PPM                        1583                176                180
    CO   CONCENTRATION PPM                         922                688                449
    CO2  CONCENTRATION PCT                         .51                .32                .43
    NOX  CONCENTRATION PPM                        27.4                7.2               32.0
    SO2  CONCENTRATION PPM                         0.0                0.0                0.0
    HC   MASS GRAMS                              58.86              11.27               6.72
    CO   MASS GRAMS                              69.18              88.86              33.44
    CO2  MASS GRAMS                             606.19             642.61             517.15
    NOX  MASS GRAMS                               2.85               1.29               3.35
    SO2  MASS GRAMS                               0.00               0.00               0.00
    TOTAL CARBON GRAMS                          246.06             223.24             161.30

    WEIGHTED MASS HC       3.31 GRAMS/KILOMETRE
    WEIGHTED MASS CO      11.27 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     98.04 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .36 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.22 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  18.6  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST           630.60 GRAMS
    ESTIMATED FUEL WEIGHT =   .73KG.
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  TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMBER 800

 DATE  1/25/77                  TIME    -0 HRS.          TEST NO.  2
 MODEL  1976 KAWASKI KZ 900 FET  1ST STEP. 3rd ADJ.  ENGINE  .9 LITRE  4
 DRIVER   JR                    TEST WT.     0 KG.       GVW    0 KG
 WET BULB TEMP  13 C            DRY BULB TEMP  24 C      REL. HUM.  25.8 PCT
 SPEC. HUM.   5.0 GRAM/KG      BARO.  746.0 MM  HG.     MEASURED FUEL  0.00 KG

   RUN DURATION            12.77 MINUTES
   BLOWER INLET PRESS. 1529.1  MM. H2O
   BLOWER DIF.  PRESS. 1625.6  MM  H2O
   BLOWER INLET TEMP.      43  DEG. C
   DYNO REVOLUTIONS     10047
   DISTANCE TRAVELED    16.70  KILOMETRES
   BLOWER REVOLUTIONS     15720
   BLOWER CU. CM /REV.  8061

   BAG RESULTS
    HC  SAMPLE  METER READING/SCALE              15.0/3
    HC  SAMPLE  PPM                                150
    HC  BACKGRD METER READING/SCALE               2.4/3
    HC  BACKGRD PPM                                 24
    CO  SAMPLE  METER READING/SCALE              69.2/4
    CO  SAMPLE  PPM                                292
    CO  BACKGRD METER READING/SCALE               1.6/4
    CO  BACKGRD PPM                                  5
    CO2 SAMPLE  METER READING/SCALE              49.5/3
    CO2 SAMPLE  PERCENT                            .86
    CO2 BACKGRD METER READING/SCALE               4.3/3
    CO2 BACKGRD PERCENT                            .07
    NOX SAMPLE  METER READING/SCALE              84.3/2
    NOX SAMPLE  PPM                               84.3
    NOX BACKGRD METER READING/SCALE               1.7/2
    NOX BACKGRD PPM                                1.7
    HC  CONCENTRATION PPM                          128
    CO  CONCENTRATION PPM                          281
    CO2 CONCENTRATION PCT                          .80
    NOX CONCENTRATION PPM                         82.7
    SO2 COCENTRATION PPM                           0.0
    HC  MASS (GRAMS)                              7.20
    CO  MASS (GRAMS)                             31.97
    CO2 MASS (GRAMS)                           1432.12
    NOX MASS (GRAMS)                             13.02
    SO2 MASS (GRAMS)                              0.00

 HC  GRAMS/KILOMETRE       .43
 CO  GRAMS/KILOMETRE      1.91
 CO2 GRAMS/KILOMETRE     85.75
 NOX GRAMS/KILOMETRE       .78
 SO2 GRAMS/KILOMETRE      0.00

 HC  GRAMS/KG OF FUEL  15.16     HC  GRAMS/MIN     .56
 CO  GRAMS/KG OF FUEL   67.3     CO  GRAMS/MIN     2.5
 CO2 GRAMS/KG OF FUEL   3016     CO2 GRAMS/MIN     112
 NOX GRAMS/KG OF FUEL  27.42     NOX GRAMS/MIN    1.02
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                     25.83  KILOMETRES/LITRE
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                   TABLE                    VEHICLE EMISSION RESULTS
                                       1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800        TEST NO. 3       DATE  1/28/77
VEHICLE MODEL  KZ900 1ST STEP, 3rd ADJUST. ENGINE     .90 LITRE 4           MFGR. CODE   -0                 YR.  1976
                                                                            CURB WT.      0 KG              GVW      0 KG
BAROMETER 739.65 MM OF HG.
DRY BULB TEMP.    26.1 DEG. C                                               WET BULB TEMP  12.8 DEG. C
REL. HUMIDITY      18 PCT.                                                  ABS. HUMIDITY   3.8 GRAMS/KG
                                                                            DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

     BLOWER DIF. PRESS., G2, *76.4 MM. H2O                                  BLOWER INLET PRESS., G1 *18.9 MM. H2O
     BAG RESULTS                                                            BLOWER INLET TEMP.   43 DEG. C
     BAG NO.                                        1              2               3
     BLOWER REVOLUTIONS                         10390          17733           10424
     ROLL COUNTS                                 3506           3825            3510
     HC   SAMPLE  METER READING/SCALE          79.8/3         20.0/3          17.5/3
     HC   SAMPLE  PPM                            798            200             175
     HC   BACKGRD METER READING/SCALE           2.0/3          2.1/3           1.6/3
     HC   BACKGRD PPM                             20             21              16
     CO   SAMPLE  METER READING/SCALE          30.4/3         27.6/3          19.7/3
     CO   SAMPLE  PPM                            717            646             452
     CO   BACKGRD METER READING/SCALE            .3/3           .2/3            .1/3
     CO   BACKGRD PPM                              6              4               2
     CO2  SAMPLE  METER READING/SCALE          35.4/3         22.3/3          29.3/3
     CO2  SAMPLE  PERCENT                        .59            .36             .48
     CO2  BACKGRD METER READING/SCALE           2.9/3          3.3/3           3.5/3
     CO2  BACKGRD PERCENT                        .04            .05             .05
     NOX  SAMPLE  METER READING/SCALE          34.4/2          9.0/2          32.2/2
     NOX  SAMPLE  PPM                           34.4            9.0            32.2
     NOX  BACKGRD METER READING/SCALE            .9/2           .9/2            .8/2
     NOX  BACKGRD PPM                             .9             .9              .8
     SO2  SAMPLE  METER READING/SCALE          -0.0/*         -0.0/*          -0.0/*
     SO2  SAMPLE  PPM                            0.0            0.0             0.0
     SO2  BACKGRD METER READING/SCALE          -0.0/*         -0.0/*          -0.0/*
     SO2  BACKGRD PPM                            0.0            0.0             0.0

     HC   CONCENTRATION PPM                      779            180             160
     CO   CONCENTRATION PPM                      698            634             443
     CO2  CONCENTRATION PCT                      .55            .31             .43
     NOX  CONCENTRATION PPM                     33.5            8.1            31.4
     SO2  CONCENTRATION PPM                      0.0            0.0             0.0
     HC   MASS GRAMS                           28.69          11.30            5.90
     CO   MASS GRAMS                           51.92          80.45           33.06
     CO2  MASS GRAMS                          697.20         625.43          508.67
     NOX  MASS GRAMS                            3.34           1.38            3.14
     SO2  MASS GRAMS                            0.00           0.00            0.00
     TOTAL CARBON GRAMS                       223.73         214.97          158.11

     WEIGHTED MASS HC       2.21 GRAMS/KILOMETRE
     WEIGHTED MASS CO       9.98 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     97.92 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .38 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       12.19 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  19.5  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST             596.81 GRAMS
     ESTIMATED FUEL WEIGHT =    .69KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 800

DATE  1/28/77                  TIME    -0 HRS.           TEST NO.  3
MODEL  1976 KAWASAKI KZ900 FET  1ST STEP, 3rd ADJ.  ENGINE  .9 LITRE  4
DRIVER   KN                    TEST WT.       0 KG.      GVW    0 KG
WET BULB TEMP  13 C            DRY BULB TEMP  23 C       REL. HUM.  27.1 PCT
SPEC. HUM.    4.9 GRAM/KG      BARO.  740.2 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION          12.76 MINUTES
  BLOWER INLET PRESS. 1524.0  MM. H20
  BLOWER DIF.  PRESS. 1689.1  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10063
  DISTANCE TRAVELED    16.73  KILOMETRES
  BLOWER REVOLUTIONS     15716
  BLOWER CU. CM /REV.  80.5

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                  12.8/3
   HC  SAMPLE  PPM                                   128
   HC  BACKGRD METER READING/SCALE                   1.3/3
   HC  BACKGRD PPM                                    13
   CO  SAMPLE  METER READING/SCALE                  57.4/*
   CO  SAMPLE  PPM                                   226
   CO  BACKGRD METER READING/SCALE                    .8/*
   CO  BACKGRD PPM                                     2
   CO2 SAMPLE  METER READING/SCALE                  46.9/3
   CO2 SAMPLE  PERCENT                               .81
   CO2 BACKGRD METER READING/SCALE                   3.4/3
   CO2 BACKGRD PERCENT                               .05
   NOX SAMPLE  METER READING/SCALE                  74.1/2
   NOX SAMPLE  PPM                                  74.1
   NOX BACKGRD METER READING/SCALE                   1.2/2
   NOX BACKGRD PPM                                   1.2
   HC  CONCENTRATION PPM                             116
   CO  CONCENTRATION PPM                             218
   CO2 CONCENTRATION PCT                             .76
   NOX CONCENTRATION PPM                            73.0
   SO2 COCENTRATION PPM                              0.0
   HC  MASS (GRAMS)                                 6.45
   CO  MASS (GRAMS)                                24.53
   CO2 MASS (GRAMS)                              1347.30
   NOX MASS (GRAMS)                                11.32
   SO2 MASS (GRAMS)                                 0.00

 HC  GRAMS/KILOMETRE       .39
 CO  GRAMS/KILOMETRE      1.47
 CO2 GRAMS/KILOMETRE     80.55
 NOX GRAMS/KILOMETRE       .68
 SO2 GRAMS/KILOMETRE      0.00

 HC  GRAMS/KG OF FUEL  14.53     HC  GRAMS/MIN     .51
 CO  GRAMS/KG OF FUEL   55.3     CO  GRAMS/MIN     1.9
 CO2 GRAMS/KG OF FUEL   3036     CO2 GRAMS/MIN     106
 NOX GRAMS/KG OF FUEL  25.52     NOX GRAMS/MIN     .89
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                     27.69  KILOMETRES/LITRE
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                  TABLE                      VEHICLE EMISSION RESULTS
                                         1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800        TEST NO. 4       DATE  3/11/77                        MFGR. CODE    -0                YR.  1976
VEHICLE MODEL  KZ-900  1ST STEP, FINAL  ENGINE   0.00 LITRE                CURB WT.      0 KG              GVW      0 KG

BAROMETER 734.82 MM OF HG.                                                 WET BULB TEMP  11.7 DEG. C
DRY BULB TEMP.    20.6 DEG. C                                              ABS. HUMIDITY   5.0 GRAMS/KG
REL. HUMIDITY      33 PCT.                                                 DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                           BLOWER INLET PRESS., G1 *11.3 MM. H2O
    BLOWER DIF. PRESS., G2, *76.4 MM. H2O                                  BLOWER INLET TEMP.   43 DEG. C
    BAG RESULTS
    BAG NO.                                      1               2               3
    BLOWER REVOLUTIONS                        10426           17843           10367
    ROLL COUNTS                                3503            3802            3462
    HC   SAMPLE  METER READING/SCALE          34.4/3          18.8/3          19.4/3
    HC   SAMPLE  PPM                           344             188             194
    HC   BACKGRD METER READING/SCALE           .9/3           1.0/3           1.0/3
    HC   BACKGRD PPM                             9              10              10
    CO   SAMPLE  METER READING/SCALE          31.9/3          50.9/3          41.2/3
    CO   SAMPLE  PPM                           754            1255             995
    CO   BACKGRD METER READING/SCALE           .1/3            .4/3            .2/3
    CO   BACKGRD PPM                             2               9               4
    CO2  SAMPLE  METER READING/SCALE          32.7/3          19.1/3          28.1/3
    CO2  SAMPLE  PERCENT                       .54             .31             .46
    CO2  BACKGRD METER READING/SCALE          2.7/3           2.6/3           2.3/3
    CO2  BACKGRD PERCENT                       .04             .04             .04
    NOX  SAMPLE  METER READING/SCALE          29.8/2           6.1/2          32.4/2
    NOX  SAMPLE  PPM                          29.8             6.1            32.4
    NOX  BACKGRD METER READING/SCALE           .7/2            .8/2            .7/2
    NOX  BACKGRD PPM                            .7              .8              .7
    SO2  SAMPLE  METER READING/SCALE         -0.0/*          -0.0/*          -0.0/*
    SO2  SAMPLE  PPM                           0.0             0.0             0.0
    SO2  BACKGRD METER READING/SCALE         -0.0/*          -0.0/*          -0.0/*
    SO2  BACKGRD PPM                           0.0             0.0             0.0

    HC   CONCENTRATION PPM                     335             178             184
    CO   CONCENTRATION PPM                     737            1227             971
    CO2  CONCENTRATION PCT                     .50             .27             .43
    NOX  CONCENTRATION PPM                    29.1             5.3            31.7
    SO2  CONCENTRATION PPM                     0.0             0.0             0.0
    HC   MASS GRAMS                          12.30           11.20            6.73
    CO   MASS GRAMS                          54.55          155.46           71.51
    CO2  MASS GRAMS                         590.36          536.43          498.12
    NOX  MASS GRAMS                           2.99             .93            3.23
    SO2  MASS GRAMS                           0.00            0.00            0.00
    TOTAL CARBON GRAMS                      195.16          222.75          172.43

    WEIGHTED MASS HC      1.68 GRAMS/KILOMETRE
    WEIGHTED MASS CO     18.15 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    48.75 GRAMS/KILOMETRE
    WEIGHTED MASS NOX      .34 GRAMS/KILOMETRE
    WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        12.11 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  19.2  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST                590.35 GRAMS
    ESTIMATED FUEL WEIGHT =    .68KG.
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     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 800

DATE  3/11/77                 TIME     -0 HRS.         TEST NO.  4
MODEL  1976 KZ-900 1ST STEP, FINAL                     ENGINE  .9 LITRE  4
DRIVER   KN                   TEST WT.      0 KG.      GVW     0 KG
WET BULB TEMP  12 C           DRY BULB TEMP  25 C      REL. HUM.  15.7 PCT
SPEC. HUM.    3.2 GRAM/KG     BARO.  734.8 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION           12.75 MINUTES
  BLOWER INLET PRESS. 1511.3  MM. H2O
  BLOWER DIF.  PRESS. 1676.4  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9811
  DISTANCE TRAVELED   16.31  KILOMETRES
  BLOWER REVOLUTIONS    15696
  BLOWER CU. CM /REV.  8024

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              14.4/3
   HC   SAMPLE  PPM                               144
   HC   BACKGRD METER READING/SCALE               1.0/3
   HC   BACKGRD PPM                                10
   CO   SAMPLE  METER READING/SCALE              30.6/3
   CO   SAMPLE  PPM                               722
   CO   BACKGRD METER READING/SCALE                .1/3
   CO   BACKGRD PPM                                 2
   CO2 SAMPLE  METER READING/SCALE               45.7/3
   CO2 SAMPLE  PERCENT                             .78
   CO2 BACKGRD METER READING/SCALE                2.5/3
   CO2 BACKGRD PERCENT                             .04
   NOX SAMPLE  METER READING/SCALE               82.0/2
   NOX SAMPLE  PPM                               82.0
   NOX BACKGRD METER READING/SCALE                 .9/2
   NOX BACKGRD PPM                                  .9
   HC   CONCENTRATION PPM                         135
   CO   CONCENTRATION PPM                         705
   CO2 CONCENTRATION PCT                           .75
   NOX CONCENTRATION PPM                         81.2
   SO2 COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                             7.43
   CO   MASS (GRAMS)                            78.59
   CO2 MASS (GRAMS)                           1318.87
   NOX MASS (GRAMS)                            11.91
   SO2 MASS (GRAMS)                             0.00

HC   GRAMS/KILOMETRE       .46
CO   GRAMS/KILOMETRE      4.82
CO2 GRAMS/KILOMETRE      80.87
NOX GRAMS/KILOMETRE        .73 .
SO2 GRAMS/KILOMETRE       0.00

HC   G AMS/KG OF FUEL  16.07      HC   GRAMS/MIN     .58
CO   GRAMS/KG OF FUEL  169.9      CO   GRAMS/MIN     6.2
CO2 GRAMS/KG OF FUEL   2851      CO2 GRAMS/MIN     103
NOX GRAMS/KG OF FUEL  25.74      NOX GRAMS/MIN     .93
SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                      25.90  KILOMETRES/LITRE
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                  TABLE                          VEHICLE EMISSION RESULTS
UNIT NO.  800        TEST NO.5           1975  LIGHT DUTY EMISSIONS TEST
VEHICLE MODEL  KZ-900 1ST STEP, FINAL   DATE  3/14/77                      MFGR. CODE   -0                YR.  1976
                                        ENGINE     .93 LITRE 4             CURB WT.     0 KG              GVM      0 KG

BAROMETER 736.85 MM OF HG.
DRY BULB TEMP.   22.2 DEG. C                                            WET BULB TEMP  19.4 DEG. C
REL. HUMIDITY     77 PCT.                                               ABS. HUMIDITY  13.4 GRAMS/KG
                                                                        DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, *89.1 MM. H2O                               BLOWER INLET PRESS., G1 *29.0 MM. H2O
    BAG RESULTS                                                         BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                       1                2                 3
    BLOWER REVOLUTIONS                          10392            17845             10389
    ROLL COUNTS                                  3458             3720              3461
    HC   SAMPLE  METER READING/SCALE            38.5/3           19.4/3            20.2/3
    HC   SAMPLE  PPM                             385              194               202
    HC   BACKGRD METER READING/SCALE             1.5/3            1.4/3             1.6/3
    HC   BACKGRD PPM                              15               14                16
    CO   SAMPLE  METER READING/SCALE            36.3/3           48.3/3            38.8/3
    CO   SAMPLE  PPM                             867              1184              932
    CO   BACKGRD METER READING/SCALE             .5/3             .4/3              .3/3
    CO   BACKGRD PPM                              11                9                 6
    CO2  SAMPLE  METER READING/SCALE            32.1/3           18.9/3            28.3/3
    CO2  SAMPLE  PERCENT                          .53              .30               .47
    CO2  BACKGRD METER READING/SCALE             3.6/3            3.9/3             3.4/3
    CO2  BACKGRD PERCENT                          .06              .06               .05
    NOX  SAMPLE  METER READING/SCALE            22.7/2            4.7/2            24.6/2
    NOX  SAMPLE  PPM                            22.7              4.7              24.6
    NOX  BACKGRD METER READING/SCALE             .9/2             .8/2              .8/2
    NOX  BACKGRD PPM                              .9               .8                .8
    SO2  SAMPLE  METER READING/SCALE           -0.0/*           -0.0/*            -0.0/*
    SO2  SAMPLE  PPM                             0.0              0.0               0.0
    SO2  BACKGRD METER READING/SCALE           -0.0/*           -0.0/*            -0.0/*
    SO2  BACKGRD PPM                             0.0              0.0               0.0

    HC   CONCENTRATION PPM                       371              180               187
    CO   CONCENTRATION PPM                       826              1140              899
    CO2  CONCENTRATION PCT                        .48              .25               .42
    NOX  CONCENTRATION PPM                      21.8              3.9              23.8
    SO2  CONCENTRATION PPM                       0.0              0.0               0.0
    HC   MASS GRAMS                            13.57            11.34              6.83
    CO   MASS GRAMS                            61.08           144.64             66.06
    CO2  MASS GRAMS                           561.19           491.33            489.98
    NOX  MASS GRAMS                             2.91              .90              3.17
    SO2  MASS GRAMS                             0.00             0.00              0.00
    TOTAL CARBON GRAMS                        191.09           205.94            166.60

    WEIGHTED MASS HC       1.77 GRAMS/KILOMETRE
    WEIGHTED MASS CO      17.48 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     84.55 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .33 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        11.94 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  20.0  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              563.62 GRAMS
    ESTIMATED FUEL WEIGHT =    .65KG.
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      TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                               VEHICLE NUMBER 800

DATE  3/11/77                   TIME      -0 HRS.         TEST NO.   5
MODEL  1976 KZ-900 1ST STEP, FINAL                        ENGINE  .9 LITRE  4
DRIVER   KN                     TEST WT.       0 KG.      GVW    0 KG
WET BULB TEMP  12 C             DRY BULB TEMP  24 C       REL. HUM.  17.4 PCT
SPEC. HUM.    3.4 GRAM/KG       BARO.  739.6 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION            12.75 MINUTES
  BLOWER INLET PRESS. 1518.9  MM. H2O
  BLOWER DIF.  PRESS. 1676.4  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9827
  DISTANCE TRAVELED   16.33  KILOMETRES
  BLOWER REVOLUTIONS    15721
  BLOWER CU. CM /REV.  8026

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                   14.3/3
   HC   SAMPLE  PPM                                    143
   HC   BACKGRD METER READING/SCALE                    1.0/3
   HC   BACKGRD PPM                                     10
   CO   SAMPLE  METER READING/SCALE                   24.5/3
   CO   SAMPLE  PPM                                    569
   CO   BACKGRD METER READING/SCALE                     .1/3
   CO   BACKGRD PPM                                      2
   CO2  SAMPLE  METER READING/SCALE                   46.7/3
   CO2  SAMPLE  PERCENT                                .80
   CO2  BACKGRD METER READING/SCALE                    2.6/3
   CO2  BACKGRD PERCENT                                .04
   NOX  SAMPLE  METER READING/SCALE                   81.7/2
   NOX  SAMPLE  PPM                                   81.7
   NOX  BACKGRD METER READING/SCALE                    1.0/2
   NOX  BACKGRD PPM                                   1.0
   HC   CONCENTRATION PPM                             134
   CO   CONCENTRATION PPM                             555
   CO2  CONCENTRATION PCT                             .77
   NOX  CONCENTRATION PPM                            80.8
   SO2  COCENTRATION PPM                              0.0
   HC   MASS (GRAMS)                                 7.38
   CO   MASS (GRAMS)                                61.92
   CO2  MASS (GRAMS)                              1350.92
   NOX  MASS (GRAMS)                                11.93
   SO2  MASS (GRAMS)                                 0.00

 HC   GRAMS/KILOMETRE       .45
 CO   GRAMS/KILOMETRE      3.79
 CO2  GRAMS/KILOMETRE     82.67
 NOX  GRAMS/KILOMETRE       .73
 SO2  GRAMS/KILOMETRE      0.00

 HC   GRAMS/KG OF FUEL  15.90       HC   GRAMS/MIN     .58
 CO   GRAMS/KG OF FUEL  133.4       CO   GRAMS/MIN    4.9
 CO2  GRAMS/KG OF FUEL   2909       CO2  GRAMS/MIN    106
 NOX  GRAMS/KG OF FUEL  25.70       NOX  GRAMS/MIN     .94
 SO2  GRAMS/KG OF FUEL   0.00       SO2  GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                     25.85  KILOMETRES/LITRE
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                    TABLE                     VEHICLE EMISSION RESULTS
                                        1975  LIGHT DUTY EMISSIONS TEST
UNIT NO. 800       TEST NO. *        DATE  3/29/77                      MFGR. CODE   -0                 YR.  1976
VEHICLE MODEL  KZ-900 2ND STEP, AIR BY REED ENGINE   .93 LITRE 4         CURB WT.      0 KG              GVM     0 KG

BAROMETER 732.28 MM OF HG.                                          WET BULB TEMP  20.0 DEG. C
DRY BULB TEMP.    27.8 DEG. C                                       ABS. HUMIDITY  11.8 GRAMS/KG
REL. HUMIDITY     49 PCT.                                           DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                    BLOWER INLET PRESS., G1 *11.3 MM. H2O
   BLOWER DIF. PRESS., G2, *76.4 MM. H2O                            BLOWER INLET TEMP.    43 DEG. C
   BAG RESULTS
   BAG NO.                                    1             2             3
   BLOWER REVOLUTIONS                     10534         17815         10370
   ROLL COUNTS                             3535          3846          3540
   HC   SAMPLE  METER READING/SCALE      39.8/3        20.7/3        20.8/3
   HC   SAMPLE  PPM                       398           207           208
   HC   BACKGRD METER READING/SCALE       2.3/3         2.3/3         2.2/3
   HC   BACKGRD PPM                        23            23            22
   CO   SAMPLE  METER READING/SCALE      31.7/3        52.3/3        35.3/3
   CO   SAMPLE  PPM                       799          1294           841
   CO   BACKGRD METER READING/SCALE        .3/3          .6/3          .5/3
   CO   BACKGRD PPM                         6            13            11
   CO2  SAMPLE  METER READING/SCALE      29.7/3        18.0/3        24.5/3
   CO2  SAMPLE  PERCENT                   .49           .29           .40
   CO2  BACKGRD METER READING/SCALE       2.9/3         3.5/3         2.9/3
   CO2  BACKGRD PERCENT                   .04           .05           .04
   NOX  SAMPLE  METER READING/SCALE      24.2/2         5.1/2        26.2/2
   NOX  SAMPLE  PPM                      24.2           5.1          26.2
   NOX  BACKGRD METER READING/SCALE       .7/2          .7/2          .7/2
   NOX  BACKGRD PPM                        .7            .7            .7
   SO2  SAMPLE  METER READING/SCALE     -0.0/*        -0.0/*        -0.0/*
   SO2  SAMPLE  PPM                       0.0           0.0           0.0
   SO2  BACKGRD METER READING/SCALE     -0.0/*        -0.0/*        -0.0/*
   SO2  BACKGRD PPM                       0.0           0.0           0.0

   HC   CONCENTRATION PPM                 376           185           187
   CO   CONCENTRATION PPM                 724          1254           811
   CO2  CONCENTRATION PCT                 .45           .24           .36
   NOX  CONCENTRATION PPM                23.5           4.4          25.5
   SO2  CONCENTRATION PPM                 0.0           0.0           0.0
   HC   MASS GRAMS                      13.87         11.53          6.78
   CO   MASS GRAMS                      53.96        157.99         59.48
   CO2  MASS GRAMS                     526.91        469.40        412.44
   NOX  MASS GRAMS                       2.99           .95          3.19
   SO2  MASS GRAMS                       0.00          0.00          0.00
   TOTAL CARBON GRAMS                  178.95        205.83        143.94

   WEIGHTED MASS HC       1.74 GRAMS/KILOMETRE
   WEIGHTED MASS CO      17.52 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     75.86 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .33 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE       12.28 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  21.6  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST            528.73 GRAMS
   ESTIMATED FUEL WEIGHT =   .61KG.
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      TABLE              EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                                  VEHICLE NUMBER 800

   DATE  3/29/77                    TIME    -0 HRS.             TEST NO.  1
   MODEL  1976 KAWASAKI KZ-900 FET AIR REED                     ENGINE  .9 LITRE  4
   DRIVER   JB                      TEST WT.      0 KG.         GVW    0 KG
   WET BULB TEMP  20 C              DRY BULB TEMP  28 C         REL. HUM.  48.9 PCT
   SPEC. HUM.  11.8 GRAM/KG         BARO.  732.3 MM  HG.        MEASURED FUEL  0.00 KG

    RUN DURATION             12.77 MINUTES
    BLOWER INLET PRESS. 1511.3  MM. H20
    BLOWER DIF.  PRESS. 1676.9  MM  H20
    BLOWER INLET TEMP.      43  DEG. C
    DYNO REVOLUTIONS     10077
    DISTANCE TRAVELED    16.75  KILOMETRES
    BLOWER REVOLUTIONS     15712
    BLOWER CU. CM /REV.  8021

    BAG RESULTS
     HC   SAMPLE  METER READING/SCALE                       15.6/3
     HC   SAMPLE  PPM                                        156
     HC   BACKGRD METER READING/SCALE                        2.0/3
     HC   BACKGRD PPM                                         20
     CO   SAMPLE  METER READING/SCALE                       87.4/4
     CO   SAMPLE  PPM                                        420
     CO   BACKGRD METER READING/SCALE                        1.0/4
     CO   BACKGRD PPM                                          3
     CO2  SAMPLE  METER READING/SCALE                       48.1/3
     CO2  SAMPLE  PERCENT                                    .83
     CO2  BACKGRD METER READING/SCALE                        2.9/3
     CO2  BACKGRD PERCENT                                    .04
     NOX  SAMPLE  METER READING/SCALE                       67.8/2
     NOX  SAMPLE  PPM                                       67.8
     NOX  BACKGRD METER READING/SCALE                        1.1/2
     NOX  BACKGRD PPM                                        1.1
     HC   CONCENTRATION PPM                                  137
     CO   CONCENTRATION PPM                                  404
     CO2  CONCENTRATION PCT                                  .79
     NOX  CONCENTRATION PPM                                 66.8
     SO2  COCENTRATION PPM                                   0.0
     HC   MASS (GRAMS)                                      7.56
     CO   MASS (GRAMS)                                     44.92
     CO2  MASS (GRAMS)                                   1384.54
     NOX  MASS (GRAMS)                                     12.65
     SO2  MASS (GRAMS)                                      0.00

   HC   GRAMS/KILOMETRE      .45
   CO   GRAMS/KILOMETRE     2.68
   CO2  GRAMS/KILOMETRE    82.66
   NOX  GRAMS/KILOMETRE      .76
   SO2  GRAMS/KILOMETRE     0.00

   HC   GRAMS/KG OF FUEL  16.19      HC   GRAMS/MIN     .59
   CO   GRAMS/KG OF FUEL   96.3      CO   GRAMS/MIN     3.5
   CO2  GRAMS/KG OF FUEL   2967      CO2  GRAMS/MIN     108
   NOX  GRAMS/KG OF FUEL  27.10      NOX  GRAMS/MIN     .99
   SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN    0.00
   CARBON BALANCE FUEL ECONOMY                        26.37  KILOMETRES/LITRE
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                              TABLE                              VEHICLE EMISSION RESULTS
                                                          1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800          TEST NO. 1          DATE  5/30/77                       MFGR. CODE   -0                      YR.  1976
VEHICLE MODEL  KZ900 LEAN+AIR              ENGINE    .93 LITRE 4               CURB WT.     0 KG                    GVW      0 KG

BAROMETER 740.16 MM OF HG.                                            WET BULB TEMP  20.6 DEG. C
DRY BULB TEMP.    25.0 DEG. C                                         ABS. HUMIDITY  13.7 GRAMS/KG
REL. HUMIDITY     67 PCT.                                             DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, *51.0 MM. H2O                             BLOWER INLET PRESS., G1 *73.2 MM. H2O
    BAG RESULTS                                                       BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                        1               2               3
    BLOWER REVOLUTIONS                          10397           17827           10411
    ROLL COUNTS                                  3555            3853            3557
    HC   SAMPLE  METER READING/SCALE           86.4/3          16.1/3          17.7/3
    HC   SAMPLE  PPM                             864             161             177
    HC   BACKGRD METER READING/SCALE            1.9/3           1.8/3           1.8/3
    HC   BACKGRD PPM                              19              18              18
    CO   SAMPLE  METER READING/SCALE           39.4/3          25.7/3          23.6/3
    CO   SAMPLE  PPM                             947             599             547
    CO   BACKGRD METER READING/SCALE             .1/3            .1/3            .1/3
    CO   BACKGRD PPM                               2               2               2
    CO2  SAMPLE  METER READING/SCALE           37.7/3          26.3/3          32.4/3
    CO2  SAMPLE  PERCENT                         .64             .43             .54
    CO2  BACKGRD METER READING/SCALE            3.8/3           3.2/3           3.0/3
    CO2  BACKGRD PERCENT                         .06             .05             .05
    NOX  SAMPLE  METER READING/SCALE           23.1/2           4.8/2          24.0/2
    NOX  SAMPLE  PPM                            23.1             4.8            24.0
    NOX  BACKGRD METER READING/SCALE             .8/2            .6/2            .7/2
    NOX  BACKGRD PPM                              .8              .6              .7
    SO2  SAMPLE  METER READING/SCALE           -0.0/*          -0.0/*          -0.0/*
    SO2  SAMPLE  PPM                             0.0             0.0             0.0
    SO2  BACKGRD METER READING/SCALE           -0.0/*          -0.0/*          -0.0/*
    SO2  BACKGRD PPM                             0.0             0.0             0.0

    HC   CONCENTRATION PPM                       846             144             160
    CO   CONCENTRATION PPM                       913             579             528
    CO2  CONCENTRATION PCT                       .58             .38             .49
    NOX  CONCENTRATION PPM                      22.3             4.2            23.3
    SO2  CONCENTRATION PPM                       0.0             0.0             0.0
    HC   MASS GRAMS                            31.45            9.16            5.95
    CO   MASS GRAMS                            68.53           74.49           39.63
    CO2  MASS GRAMS                           687.82          778.47          587.10
    NOX  MASS GRAMS                             3.05             .99            3.19
    SO2  MASS GRAMS                             0.00            0.00            0.00
    TOTAL CARBON GRAMS                        244.33          252.33          182.37

    WEIGHTED MASS HC       2.12 GRAMS/KILOMETRE
    WEIGHTED MASS CO      10.28 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    119.40 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .33 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        12.32 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  17.1  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              679.03 GRAMS
    ESTIMATED FUEL WEIGHT =    .78KG.
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     TABLE            EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                                 VEHICLE NUMBER 800

DATE  5/30/77                  TIME     -0 HRS.           TEST NO.  1
MODEL  1976 KAWASAKI KZ900 FET LEAN + AIR                 ENGINE  .9 LITRE  4
DRIVER   KN                    TEST WT.        0 KG.      GVW    0 KG
WET BULB TEMP  19 C            DRY BULB TEMP  26 C        REL. HUM.  53.6 PCT
SPEC. HUM.  11.6 GRAM/KG       BARO.  740.4 MM  HG.       MEASURED FUEL  0.00 KG

  RUN DURATION            12.75 MINUTES
  BLOWER INLET PRESS. 1973.2  MM. H2O
  BLOWER DIF.  PRESS. 1663.7  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10006
  DISTANCE TRAVELED    16.63  KILOMETRES
  BLOWER REVOLUTIONS     15710
  BLOWER CU. CM /REV.  8043

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                        14.8/3
   HC  SAMPLE  PPM                                         148
   HC  BACKGRD METER READING/SCALE                         1.2/3
   HC  BACKGRD PPM                                          12
   CO  SAMPLE  METER READING/SCALE                        73.1/4
   CO  SAMPLE  PPM                                         317
   CO  BACKGRD METER READING/SCALE                          .7/4
   CO  BACKGRD PPM                                           2
   CO2 SAMPLE  METER READING/SCALE                        53.9/3
   CO2 SAMPLE  PERCENT                                     .94
   CO2 BACKGRD METER READING/SCALE                         3.5/3
   CO2 BACKGRD PERCENT                                     .05
   NOX SAMPLE  METER READING/SCALE                        57.4/2
   NOX SAMPLE  PPM                                        57.4
   NOX BACKGRD METER READING/SCALE                         .6/2
   NOX BACKGRD PPM                                          .6
   HC  CONCENTRATION PPM                                   137
   CO  CONCENTRATION PPM                                   303
   CO2 CONCENTRATION PCT                                   .89
   NOX CONCENTRATION PPM                                  56.8
   SO2 COCENTRATION PPM                                   0.0
   HC  MASS (GRAMS)                                       7.68
   CO  MASS (GRAMS)                                      34.40
   CO2 MASS (GRAMS)                                    1598.50
   NOX MASS (GRAMS)                                      10.91
   SO2 MASS (GRAMS)                                       0.00

 HC  GRAMS/KILOMETRE        .46
 CO  GRAMS/KILOMETRE       2.07
 CO2 GRAMS/KILOMETRE      96.11
 NOX GRAMS/KILOMETRE        .66
 SO2 GRAMS/KILOMETRE       0.00

 HC  GRAMS/KG OF FUEL  14.52     HC  GRAMS/MIN     .60
 CO  GRAMS/KG OF FUEL   65.0     CO  GRAMS/MIN     2.7
 CO2 GRAMS/KG OF FUEL   3021     CO2 GRAMS/MIN     125
 NOX GRAMS/KG OF FUEL  20.62     NOX GRAMS/MIN     .86
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                    23.09  KILOMETRES/LITRE
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                    TABLE                      VEHICLE EMISSION RESULTS
                                           1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800          TEST NO. 2      DATE  5/31/77
VEHICLE MODEL  KZ900 LEAN + AIR        ENGINE     .92 LITRE 4            MFGR. CODE    -0                    YR.  1976
                                                                          CURB WT.       0 KG                 GVM       0 KG
BAROMETER 743.20 MM OF HG.
DRY BULB TEMP.    26.1 DEG. C                                          WET BULB TEMP  20.0 DEG. C
REL. HUMIDITY      57 PCT.                                             ABS. HUMIDITY  12.3 GRAMS/KG
                                                                        DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, *51.0 MM, H2O                               BLOWER INLET PRESS., G1 *73.2 MM, H2O
    BAG RESULTS                                                         BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                          1              2              3
    BLOWER REVOLUTIONS                           10369          17813          10375
    ROLL COUNTS                                   3493           3857           3547
    HC   SAMPLE  METER READING/SCALE            99.6/3         17.2/3         19.3/3
    HC   SAMPLE  PPM                               996            172            193
    HC   BACKGRD METER READING/SCALE             2.8/3          3.3/3          2.3/3
    HC   BACKGRD PPM                                28             33             23
    CO   SAMPLE  METER READING/SCALE            38.7/3         24.6/3         22.2/3
    CO   SAMPLE  PPM                               929            572            513
    CO   BACKGRD METER READING/SCALE              .3/3           .5/3           .2/3
    CO   BACKGRD PPM                                 6             11              4
    CO2  SAMPLE  METER READING/SCALE            38.0/3         27.3/3         34.9/3
    CO2  SAMPLE  PERCENT                           .64            .45            .58
    CO2  BACKGRD METER READING/SCALE             3.9/3          4.3/3          4.0/3
    CO2  BACKGRD PERCENT                           .06            .07            .06
    NOX  SAMPLE  METER READING/SCALE            25.0/2          6.0/2         25.6/2
    NOX  SAMPLE  PPM                              25.0            6.0           25.6
    NOX  BACKGRD METER READING/SCALE             1.2/2          1.1/2           .9/2
    NOX  BACKGRD PPM                               1.2            1.1             .9
    SO2  SAMPLE  METER READING/SCALE           -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                               0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE           -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                               0.0            0.0            0.0

    HC   CONCENTRATION PPM                         970            140            171
    CO   CONCENTRATION PPM                         895            546            494
    CO2  CONCENTRATION PCT                         .58            .38            .53
    NOX  CONCENTRATION PPM                        23.9            4.9           24.7
    SO2  CONCENTRATION PPM                         0.0            0.0            0.0
    HC   MASS GRAMS                              36.10           8.98           6.38
    CO   MASS GRAMS                              67.25          70.56          37.15
    CO2  MASS GRAMS                             693.92         784.29         624.75
    NOX  MASS GRAMS                               3.11           1.11           3.23
    SO2  MASS GRAMS                               0.00           0.00           0.00
    TOTAL CARBON GRAMS                          249.47         252.08         191.96

    WEIGHTED MASS HC       2.29 GRAMS/KILOMETRE
    WEIGHTED MASS CO       9.83 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    117.27 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .35 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.27 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  16.8  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST            693.51 GRAMS
    ESTIMATED FUEL WEIGHT =    .80KG.
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     TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 800

                                                     TEST NO.  2
DATE  5/31/77                  TIME                  ENGINE  .9 LITRE  9
MODEL  1976 KAWASAKI KZ900 FET LEAN+AIR              GVW    0 KG
DRIVER   KN                    TEST WT.     0 KG.    REL. HUM.  53.6 PCT
WET BULB TEMP  19 C            DRY BULB TEMP  26 C   MEASURED FUEL  0.00 KG
SPFC. HUM.  11.6 GRAM/KG       BARO.  743.5 MM  HG.

  RUN DURATION          12.76 MINUTES
  BLOWER INLET PRESS. 1478.3  MM. H2O
  BLOWER DIF.  PRESS. 1651.0  MM  H2O
  BLOWER INLET TEMP.     43  DEG. C
  DYNO REVOLUTIONS     10130
  DISTANCE TRAVELED   16.84  KILOMETRES
  BLOWER REVOLUTIONS    15713
  BLOWER CU. CM /REV.  8052

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                  13.4/3
   HC  SAMPLE  PPM                                   134
   HC  BACKGRD METER READING/SCALE                   1.5/3
   HC  BACKGRD PPM                                    15
   CO  SAMPLE  METER READING/SCALE                  65.6/4
   CO  SAMPLE  PPM                                   271
   CO  BACKGRD METER READING/SCALE                    .9/4
   CO  BACKGRD PPM                                     3
   CO2 SAMPLE  METER READING/SCALE                  55.5/3
   CO2 SAMPLE  PERCENT                                .97
   CO2 BACKGRD METER READING/SCALE                   3.6/3
   CO2 BACKGRD PERCENT                                .06
   NOX SAMPLE  METER READING/SCALE                  60.5/2
   NOX SAMPLE  PPM                                  60.5
   NOX BACKGRD METER READING/SCALE                   1.1/2
   NOX BACKGRD PPM                                   1.1
   HC  CONCENTRATION PPM                             120
   CO  CONCENTRATION PPM                             259
   CO2 CONCENTRATION PCT                             .92
   NOX CONCENTRATION PPM                            59.5
   SO2 COCENTRATION PPM                              0.0
   HC  MASS (GRAMS)                                 6.78
   CO  MASS (GRAMS)                                29.48
   CO2 MASS (GRAMS)                              1661.91
   NOX MASS (GRAMS)                                11.46
   SO2 MASS (GRAMS)                                 0.00

 HC  GRAMS/KILOMETRE        .40
 CO  GRAMS/KILOMETRE       1.75
 CO2 GRAMS/KILOMETRE      98.67
 NOX GRAMS/KILOMETRE        .68
 SO2 GRAMS/KILOMETRE       0.00

 HC  GRAMS/KG OF FUEL  12.43      HC  GRAMS/MIN    .53
 CO  GRAMS/KG OF FUEL   54.0      CO  GRAMS/MIN    2.3
 CO2 GRAMS/KG OF FUEL   3045      CO2 GRAMS/MIN    130
 NOX GRAMS/KG OF FUEL  21.00      NOX GRAMS/MIN    .90
 SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                   22.67  KILOMETRES/LITRE
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                      TABLE                          VEHICLE EMISSION RESULTS
                                                1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800         TEST NO. 1         DATE  6/10/77                     MFGR. CODE   -0                      YR.  1976
VEHICLE MODEL  KZ-900 LN+AIR+PL          ENGINE    .92 LITRE 4             CURB WT.     0 KG                    GVW      0 KG

BAROMETER 742.44 MM OF HG.                                                 WET BULB TEMP  20.6 DEG. C
DRY BULB TEMP.    26.1 DEG. C                                              ABS. HUMIDITY  13.1 GRAMS/KG
REL. HUMIDITY     61 PCT.                                                  DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                           BLOWER INLET PRESS., G1 *60.5 MM. H2O
     BLOWER DIF. PRESS., G2, *25.6 MM. H2O                                 BLOWER INLET TEMP.    43 DEG. C
     BAG RESULTS
     BAG NO.                                            1               2                3
     BLOWER REVOLUTIONS                             10923           17831            10383
     ROLL COUNTS                                     3528            3872             3567
     HC    SAMPLE  METER READING/SCALE             47.7/3          14.2/3           18.6/3
     HC    SAMPLE  PPM                               477             142              186
     HC    BACKGRD METER READING/SCALE              1.9/3           1.7/3            1.9/3
     HC    BACKGRD PPM                                19              17               19
     CO    SAMPLE  METER READING/SCALE             32.3/3          21.3/3           21.2/3
     CO    SAMPLE  PPM                               765             491              488
     CO    BACKGRD METER READING/SCALE               .2/3            .2/3             .3/3
     CO    BACKGRD PPM                                 4               4                6
     CO2   SAMPLE  METER READING/SCALE             37.4/3          25.8/3           33.0/3
     CO2   SAMPLE  PERCENT                           .63             .42              .55
     CO2   BACKGRD METER READING/SCALE              4.2/3           3.8/3            3.4/3
     CO2   BACKGRD PERCENT                           .06             .06              .05
     NOX   SAMPLE  METER READING/SCALE             23.0/2           4.8/2           25.5/2
     NOX   SAMPLE  PPM                              23.0             4.8             25.5
     NOX   BACKGRD METER READING/SCALE               .6/2            .4/2             .5/2
     NOX   BACKGRD PPM                                .6              .4               .5
     SO2   SAMPLE  METER READING/SCALE             -0.0/*          -0.0/*           -0.0/*
     SO2   SAMPLE  PPM                               0.0             0.0              0.0
     SO2   BACKGRD METER READING/SCALE             -0.0/*          -0.0/*           -0.0/*
     SO2   BACKGRD PPM                               0.0             0.0              0.0

     HC    CONCENTRATION PPM                         459             126              168
     CO    CONCENTRATION PPM                         736             473              468
     CO2   CONCENTRATION PCT                         .57             .37              .50
     NOX   CONCENTRATION PPM                        22.4             4.4             25.0
     SO2   CONCENTRATION PPM                         0.0             0.0              0.0
     HC    MASS GRAMS                              17.23            8.06             6.27
     CO    MASS GRAMS                              55.79           61.32            35.28
     CO2   MASS GRAMS                             680.51          742.80           595.57
     NOX   MASS GRAMS                               3.03            1.02             3.37
     SO2   MASS GRAMS                               0.00            0.00             0.00
     TOTAL CARBON GRAMS                           224.56          237.36           183.11

     WEIGHTED MASS HC        1.54 GRAMS/KILOMETRE
     WEIGHTED MASS CO        8.52 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     111.52 GRAMS/KILOMETRE
     WEIGHTED MASS NOX        .39 GRAMS/KILOMETRE
     WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       12.38 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  19.1  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST               645.03 GRAMS
     ESTIMATED FUEL WEIGHT =    .75KG.
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TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                      VEHICLE NUMBER 800

DATE  6/10/77                  TIME  1020 HRS.          TEST NO.  1
MODEL  1976 KAWASAKI KZ-900 FET LN+AIR+PI               ENGINE  .9 LITRE  4
DRIVER   KN                    TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  21 C            DRY BULB TEMP  26 C      REL. HUM.  60.5 PCT
SPEC. HUM.  13.1 GRAM/KG       BARO.  742.4 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION            12.76 MINUTES
  BLOWER INLET PRESS. 1460.5  MM. H20
  BLOWER DIF.  PRESS. 1625.6  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10074
  DISTANCE TRAVELED    16.75  KILOMETRES
  BLOWER REVOLUTIONS    15709
  BLOWER CU. CM /REV.  8064

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              11.1/3
   HC   SAMPLE  PPM                               111
   HC   BACKGRD METER READING/SCALE               1.8/3
   HC   BACKGRD PPM                                18
   CO   SAMPLE  METER READING/SCALE              68.5/4
   CO   SAMPLE  PPM                               288
   CO   BACKGRD METER READING/SCALE               1.3/4
   CO   BACKGRD PPM                                 4
   CO2  SAMPLE  METER READING/SCALE              53.3/3
   CO2  SAMPLE  PERCENT                           .93
   CO2  BACKGRD METER READING/SCALE               3.9/3
   CO2  BACKGRD PERCENT                           .06
   NOX  SAMPLE  METER READING/SCALE              62.1/2
   NOX  SAMPLE  PPM                              62.1
   NOX  BACKGRD METER READING/SCALE               1.0/2
   NOX  BACKGRD PPM                               1.0
   HC   CONCENTRATION PPM                          94
   CO   CONCENTRATION PPM                         274
   CO2  CONCENTRATION PCT                         .88
   NOX  CONCENTRATION PPM                        61.2
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                             5.39
   CO   MASS (GRAMS)                            31.25
   CO2  MASS (GRAMS)                          1578.59
   NOX  MASS (GRAMS)                            12.46
   SO2  MASS (GRAMS)                             0.00

 HC   GRAMS/KILOMETRE        .32
 CO   GRAMS/KILOMETRE       1.87
 CO2  GRAMS/KILOMETRE      94.27
 NOX  GRAMS/KILOMETRE        .74
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  10.28     HC   GRAMS/MIN     .42
 CO   GRAMS/KG OF FUEL   60.2     CO   GRAMS/MIN     2.4
 CO2  GRAMS/KG OF FUEL   3042     CO2  GRAMS/MIN     124
 NOX  GRAMS/KG OF FUEL  24.01     NOX  GRAMS/MIN     .98
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                     23.71  KILOMETRES/LITRE
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                    TABLE                 VEHICLE EMISSION RESULTS
                                     1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  900       TEST NO. 2       DATE  6/13/77                  MFGR. CODE    -0                 YR.  1974
VEHICLE MODEL  KZ-900 LN+AIR+PL      ENGINE    .92 LITRE *          CURB WT.      0 KG               GVW      0 KG

BAROMETER 738.63 MM OF HG.                                         WET BULB TEMP  19.4 DEG. C
DRY BULB TEMP.    25.6 DEG. C                                      ABS. HUMIDITY  11.9 GRAMS/KG
REL. HUMIDITY      57 PCT.              -                          DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                   BLOWER INLET PRESS., G1 *47.8 MM. H2O
    BLOWER DIF. PRESS., G2, *25.6 MM. H2O                          BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                     1              2              3
    BLOWER REVOLUTIONS                        10907          17817          10389
    ROLL COUNTS                                3577           3880           3[illegible]61
    HC   SAMPLE  METER READING/SCALE          43.1/3         14.4/3         16.2/3
    HC   SAMPLE  PPM                           431            144            162
    HC   BACKGRD METER READING/SCALE          2.6/3          2.6/3          2.2/3
    HC   BACKGRD PPM                            26             26             22
    CO   SAMPLE  METER READING/SCALE          26.9/3         94.7/*         90.3/*
    CO   SAMPLE  PPM                           616            485            445
    CO   BACKGRD METER READING/SCALE           .2/3           .2/3          2.0/*
    CO   BACKGRD PPM                             4              4              6
    CO2  SAMPLE  METER READING/SCALE          35.4/3         26.4/3         29.7/3
    CO2  SAMPLE  PERCENT                        .59            .43            .49
    CO2  BACKGRD METER READING/SCALE          3.2/3          3.4/3          3.4/3
    CO2  BACKGRD PERCENT                        .05            .05            .05
    NOX  SAMPLE  METER READING/SCALE          23.6/2         5.2/2          23.4/2
    NOX  SAMPLE  PPM                           23.6           5.2            23.4
    NOX  BACKGRD METER READING/SCALE           .5/2           .5/2           .4/2
    NOX  BACKGRD PPM                            .5             .5             .4
    SO2  SAMPLE  METER READING/SCALE         -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                           0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE         -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                           0.0            0.0            0.0

    HC   CONCENTRATION PPM                     406            119            141
    CO   CONCENTRATION PPM                     594            468            427
    CO2  CONCENTRATION PCT                      .55            .38            .44
    NOX  CONCENTRATION PPM                     23.1           4.7            23.0
    SO2  CONCENTRATION PPM                     0.0            0.0            0.0
    HC   MASS GRAMS                           15.15           7.59           5.24
    CO   MASS GRAMS                           44.71          60.34          32.07
    CO2  MASS GRAMS                          649.68         777.13         522.23
    NOX  MASS GRAMS                            2.99           1.09           2.95
    SO2  MASS GRAMS                            0.00           0.00           0.00
    TOTAL CARBON GRAMS                       209.59         244.55         160.82

    WEIGHTED MASS HC       1.38 GRAMS/KILOMETRE
    WEIGHTED MASS CO       7.91 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    109.38 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .32 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.38 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  19.6  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST               614.96 GRAMS
    ESTIMATED FUEL WEIGHT =   .71KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 800

DATE  6/13/77                   TIME    -0 HRS.          TEST NO.  2
MODEL  1976 KAWASAKI KZ-900 FET LN+AIR+PL                ENGINE  .9 LITRE  4
DRIVER   KN                     TEST WT.     0 KG.       GVW    0 KG
WET BULB TEMP  19 C             DRY BULB TEMP  26 C      REL. HUM.  53.1 PCT
SPEC. HUM.  11.2 GRAM/KG        BARO.  739.1 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION             12.76 MINUTES
  BLOWER INLET PRESS. 1997.8  MM. H20
  BLOWER DIF.  PRESS. 1625.6  MM  H20
  BLOWER INLET TEMP.      37  DEG. C
  DYNO REVOLUTIONS      10060
  DISTANCE TRAVELED    16.72  KILOMETRES
  BLOWER REVOLUTIONS     15701
  BLOWER CU. CM /REV.  8012

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                10.8/3
   HC  SAMPLE  PPM                                 108
   HC  BACKGRD METER READING/SCALE                 1.9/3
   HC  BACKGRD PPM                                  19
   CO  SAMPLE  METER READING/SCALE                49.2/4
   CO  SAMPLE  PPM                                 292
   CO  BACKGRD METER READING/SCALE                 1.3/4
   CO  BACKGRD PPM                                   4
   CO2 SAMPLE  METER READING/SCALE                52.4/3
   CO2 SAMPLE  PERCENT                             .91
   CO2 BACKGRD METER READING/SCALE                 3.8/3
   CO2 BACKGRD PERCENT                             .06
   NOX SAMPLE  METER READING/SCALE                63.6/2
   NOX SAMPLE  PPM                                63.6
   NOX BACKGRD METER READING/SCALE                  .9/2
   NOX BACKGRD PPM                                  .9
   HC  CONCENTRATION PPM                            90
   CO  CONCENTRATION PPM                           279
   CO2 CONCENTRATION PCT                           .86
   NOX CONCENTRATION PPM                          62.8
   SO2 COCENTRATION PPM                            0.0
   HC  MASS (GRAMS)                               5.14
   CO  MASS (GRAMS)                              32.02
   CO2 MASS (GRAMS)                            1560.37
   NOX MASS (GRAMS)                              12.03
   SO2 MASS (GRAMS)                               0.00

 HC  GRAMS/KILOMETRE       .31
 CO  GRAMS/KILOMETRE      1.92
 CO2 GRAMS/KILOMETRE     93.31
 NOX GRAMS/KILOMETRE       .72
 SO2 GRAMS/KILOMETRE      0.00

 HC  GRAMS/KG OF FUEL  10.02     HC  GRAMS/MIN     .40
 CO  GRAMS/KG OF FUEL   62.4     CO  GRAMS/MIN     2.5
 CO2 GRAMS/KG OF FUEL   3040     CO2 GRAMS/MIN     122
 NOX GRAMS/KG OF FUEL  23.43     NOX GRAMS/MIN     .94
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                     23.93  KILOMETRES/LITRE
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                    TABLE   .                 VEHICLE EMISSION RESULTS
                                        1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800       TEST NO. 3          DATE  8/ 2/77                MFGR. CODE    -0                  YR.  1976
VEHICLE MODEL  KZ-900 LN+AIR+PL         ENGINE     .92 LITRE 4       CURB WT.      0 KG                GVM      0 KG

BAROMETER 740.16 MM OF HG.                                       WET BULB TEMP  21.7 DEG. C
DRY BULB TEMP.    27.8 DEG. C                                    ABS. HUMIDITY  14.0 GRAMS/KG
REL. HUMIDITY      58 PCT.                                       DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS

     BLOWER DIF. PRESS., G2, *25.6 MM. H2O                       BLOWER INLET PRESS., G1 *47.8 MM. H2O
     BAG RESULTS                                                 BLOWER INLET TEMP.    43 DEG. C
     BAG NO.                                   1              2              3
     BLOWER REVOLUTIONS                     10408          17831          10408
     ROLL COUNTS                             3482           3777           3500
     HC    SAMPLE  METER READING/SCALE      46.7/3         16.0/3         16.4/3
     HC    SAMPLE  PPM                       467            160            164
     HC    BACKGRD METER READING/SCALE       2.2/3          2.2/3          1.6/3
     HC    BACKGRD PPM                        22             22             16
     CO    SAMPLE  METER READING/SCALE      28.4/3         23.3/3         23.4/3
     CO    SAMPLE  PPM                       666            540            542
     CO    BACKGRD METER READING/SCALE        .2/3           .2/3           .3/3
     CO    BACKGRD PPM                         4              4              6
     CO2   SAMPLE  METER READING/SCALE      36.5/3         27.2/3         31.7/3
     CO2   SAMPLE  PERCENT                   .61            .45            .53
     CO2   BACKGRD METER READING/SCALE       3.7/3          4.1/3          3.7/3
     CO2   BACKGRD PERCENT                   .06            .06            .06
     NOX   SAMPLE  METER READING/SCALE      21.4/2          4.8/2         23.2/2
     NOX   SAMPLE  PPM                      21.4            4.8           23.2
     NOX   BACKGRD METER READING/SCALE        .8/2           .6/2           .6/2
     NOX   BACKGRD PPM                        .8             .6             .6
     SO2   SAMPLE  METER READING/SCALE      -0.0/*         -0.0/*         -0.0/*
     SO2   SAMPLE  PPM                       0.0            0.0            0.0
     SO2   BACKGRD METER READING/SCALE      -0.0/*         -0.0/*         -0.0/*
     SO2   BACKGRD PPM                       0.0            0.0            0.0

     HC    CONCENTRATION PPM                 446            139            149
     CO    CONCENTRATION PPM                 642            521            520
     CO2   CONCENTRATION PCT                 .56            .39            .47
     NOX   CONCENTRATION PPM                20.6            4.2           22.6
     SO2   CONCENTRATION PPM                 0.0            0.0            0.0
     HC    MASS GRAMS                      16.68           8.89           5.56
     CO    MASS GRAMS                      48.49          67.34          39.28
     CO2   MASS GRAMS                     666.81         787.29         562.44
     NOX   MASS GRAMS                       2.87           1.01           3.15
     SO2   MASS GRAMS                       0.00           0.00           0.00
     TOTAL CARBON GRAMS                   217.19         251.44         175.16

     WEIGHTED MASS HC       1.59 GRAMS/KILOMETRE
     WEIGHTED MASS CO       4.15 GRAMS/KILOMETRE
     WEIGHTED MASS CO2    115.42 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .33 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       12.09 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  17.4  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST              643.79 GRAMS
     ESTIMATED FUEL WEIGHT =   .74KG.
     TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 800

DATE  8/ 2/77                  TIME    -0 HRS.         TEST NO.  3
MODEL  1976 KAWASAKI KZ-900 FET LN+AIR+PL               ENGINE  .9 LITRE  4
DRIVER   KN                    TEST WT.       0 KG.    GVW    0 KG
WET BULB TEMP  22 C            DRY BULB TEMP  31 C     REL. HUM.  48.5 PCT
SPEC. HUM.  13.7 GRAM/KG       BARO.  739.6 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION          12.77 MINUTES
  BLOWER INLET PRESS. 1447.8  MM. H2O
  BLOWER DIF.  PRESS. 1625.6  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9886
  DISTANCE TRAVELED   16.43  KILOMETRES
  BLOWER REVOLUTIONS    15734
  BLOWER CU. CM /REV.  8063

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                 10.5/3
   HC   SAMPLE  PPM                                  105
   HC   BACKGRD METER READING/SCALE                  1.9/3
   HC   BACKGRD PPM                                   19
   CO   SAMPLE  METER READING/SCALE                 77.1/4
   CO   SAMPLE  PPM                                  345
   CO   BACKGRD METER READING/SCALE                   .9/4
   CO   BACKGRD PPM                                    3
   CO2  SAMPLE  METER READING/SCALE                 50.2/3
   CO2  SAMPLE  PERCENT                              .87
   CO2  BACKGRD METER READING/SCALE                  4.2/3
   CO2  BACKGND PERCENT                              .06
   NOX  SAMPLE  METER READING/SCALE                 59.9/2
   NOX  SAMPLE  PPM                                 59.9
   NOX  BACKGND METER READING/SCALE                  1.0/2
   NOX  BACKGND PPM                                  1.0
   HC   CONCENTRATION PPM                            87
   CO   CONCENTRATION PPM                           332
   CO2  CONCENTRATION PCT                           .81
   NOX  CONCENTRATION PPM                          59.0
   SO2  COCENTRATION PPM                            0.0
   HC   MASS (GRAMS)                               4.93
   CO   MASS (GRAMS)                              37.81
   CO2  MASS (GRAMS)                            1459.77
   NOX  MASS (GRAMS)                              12.23
   SO2  MASS (GRAMS)                               0.00

 HC   GRAMS/KILOMETRE        .30
 CO   GRAMS/KILOMETRE       2.30
 CO2  GRAMS/KILOMETRE      88.83
 NOX  GRAMS/KILOMETRE        .74
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  10.18      HC   GRAMS/MIN     .39
 CO   GRAMS/KG OF FUEL   78.1      CO   GRAMS/MIN     3.0
 CO2  GRAMS/KG OF FUEL   3019      CO2  GRAMS/MIN     114
 NOX  GRAMS/KG OF FUEL  25.25      NOX  GRAMS/MIN     .96
 SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                       24.93  KILOMETRES/LITRE
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             TABLE                              VEHICLE EMISSION RESULTS
                                         1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800          TEST NO. 4        DATE  8/ 3/77                        MFGR. CODE    -0                  YR.  1976
VEHICLE MODEL  KZ-900 LN+AIR+PL          ENGINE     .92 LITRE 4               CURB WT.      0 KG                GVM      0 KG

BAROMETER 741.17 MM OF HG.                                              WET BULB TEMP  22.2 DEG. C
DRY BULB TEMP.    28.3 DEG. C                                           ABS. HUMIDITY  14.6 GRAMS/KG
REL. HUMIDITY      59 PCT.                                              DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                        BLOWER INLET PRESS., G1 *98.6 MM. H2O
     BLOWER DIF. PRESS., G2, *25.6 MM. H2O                              BLOWER INLET TEMP.    43 DEG. C
     BAG RESULTS
     BAG NO.                                          1                 2                 3
     BLOWER REVOLUTIONS                           10902             17822             10391
     ROLL COUNTS                                   3451              3798              3521
     HC   SAMPLE  METER READING/SCALE            47.4/3            15.1/3            17.0/3
     HC   SAMPLE  PPM                              474               151               170
     HC   BACKGRD METER READING/SCALE             1.6/3             1.8/3             1.6/3
     HC   BACKGRD PPM                               16                18                16
     CO   SAMPLE  METER READING/SCALE            27.3/3            96.5/*            93.3/*
     CO   SAMPLE  PPM                              639               504               474
     CO   BACKGRD METER READING/SCALE              .4/3              .3/3             1.6/*
     CO   BACKGRD PPM                                9                 6                 5
     CO2  SAMPLE  METER READING/SCALE            33.5/3            25.3/3            29.8/3
     CO2  SAMPLE  PERCENT                          .56               .41               .49
     CO2  BACKGRD METER READING/SCALE             2.4/3             3.2/3             2.8/3
     CO2  BACKGRD PERCENT                          .04               .05               .04
     NOX  SAMPLE  METER READING/SCALE            20.8/2             6.1/2            21.0/2
     NOX  SAMPLE  PPM                             20.8               6.1              21.0
     NOX  BACKGRD METER READING/SCALE             2.3/2             1.7/2             1.5/2
     NOX  BACKGRD PPM                              2.3               1.7               1.5
     SO2  SAMPLE  METER READING/SCALE            -0.0/*            -0.0/*            -0.0/*
     SO2  SAMPLE  PPM                              0.0               0.0               0.0
     SO2  BACKGRD METER READING/SCALE            -0.0/*            -0.0/*            -0.0/*
     SO2  BACKGRD PPM                              0.0               0.0               0.0

     HC   CONCENTRATION PPM                        459               134               155
     CO   CONCENTRATION PPM                        612               485               456
     CO2  CONCENTRATION PCT                        .52               .37               .45
     NOX  CONCENTRATION PPM                       18.6               4.5              19.6
     SO2  CONCENTRATION PPM                        0.0               0.0               0.0
     HC   MASS GRAMS                             17.06              8.51              5.74
     CO   MASS GRAMS                             45.92             62.34             34.21
     CO2  MASS GRAMS                            620.86            742.57            534.18
     NOX  MASS GRAMS                              2.63              1.09              2.76
     SO2  MASS GRAMS                              0.00              0.00              0.00
     TOTAL CARBON GRAMS                         203.90            236.76            165.43

     WEIGHTED MASS HC        1.58 GRAMS/KILOMETRE
     WEIGHTED MASS CO        8.38 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     108.45 GRAMS/KILOMETRE
     WEIGHTED MASS NOX        .31 GRAMS/KILOMETRE
     WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE        12.12 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  18.6  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST            606.10 GRAMS
     ESTIMATED FUEL WEIGHT =    .70KG.
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      TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                             VEHICLE NUMBER 800

DATE  8/ 3/77               TIME     -0 HRS.         TEST NO.  4
MODEL  1976 KAWASAKI KZ-900 FET LN+AIR+PL            ENGINE  .9 LITRE  4
DRIVER   KN                 TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  22 C         DRY BULB TEMP  28 C      REL. HUM.  58.9 PCT
SPEC. HUM.  14.6 GRAM/KG    BARO.  740.9 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION            12.76 MINUTES
  BLOWER INLET PRESS. 1625.6  MM. H2O
  BLOWER DIF.  PRESS. 1701.8  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9893
  DISTANCE TRAVELED   16.44  KILOMETRES
  BLOWER REVOLUTIONS    15718
  BLOWER CU. CM /REV.  8011

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              10.8/3
   HC   SAMPLE  PPM                               108
   HC   BACKGRD METER READING/SCALE               1.6/3
   HC   BACKGRD PPM                                16
   CO   SAMPLE  METER READING/SCALE              70.9/*
   CO   SAMPLE  PPM                               304
   CO   BACKGRD METER READING/SCALE               1.0/*
   CO   BACKGRD PPM                                 3
   CO2  SAMPLE  METER READING/SCALE              48.5/3
   CO2  SAMPLE  PERCENT                           .84
   CO2  BACKGRD METER READING/SCALE               3.2/3
   CO2  BACKGRD PERCENT                           .05
   NOX  SAMPLE  METER READING/SCALE              55.2/2
   NOX  SAMPLE  PPM                              55.2
   NOX  BACKGRD METER READING/SCALE               1.2/2
   NOX  BACKGRD PPM                               1.2
   HC   CONCENTRATION PPM                          93
   CO   CONCENTRATION PPM                         291
   CO2  CONCENTRATION PCT                         .79
   NOX  CONCENTRATION PPM                        54.1
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                             5.12
   CO   MASS (GRAMS)                            32.28
   CO2  MASS (GRAMS)                          1389.61
   NOX  MASS (GRAMS)                            11.31
   SO2  MASS (GRAMS)                             0.00

HC   GRAMS/KILOMETRE       .31
CO   GRAMS/KILOMETRE      1.96
CO2  GRAMS/KILOMETRE     84.50
NOX  GRAMS/KILOMETRE       .69
SO2  GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL  11.13     HC   GRAMS/MIN     .40
CO   GRAMS/KG OF FUEL   70.2     CO   GRAMS/MIN     2.5
CO2  GRAMS/KG OF FUEL   3024     CO2  GRAMS/MIN     109
NOX  GRAMS/KG OF FUEL  24.62     NOX  GRAMS/MIN     .89
SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                     26.29  KILOMETRES/LITRE
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                    TABLE                          VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800       TEST NO. 1          DATE   8/ 8/77                    MFGR. CODE    -0                       YR.  1976
VEHICLE MODEL  KZ900 LN+PL+CAT+CDI+AIR  ENGINE      .90 LITRE 4           CURB WT.       0 KG                    GVW      0 KG

BAROMETER 741.68 MM OF HG.                                               WET BULB TEMP  23.9 DEG. C
DRY BULB TEMP.    31.7 DEG. C                                            ABS. HUMIDITY  15.7 GRAMS/KG
REL. HUMIDITY       52 PCT.                                              DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS

     BLOWER DIF. PRESS., G2, *25.6 MM. H2O                               BLOWER INLET PRESS., G1 *60.5 MM. H2O
     BAG RESULTS                                                         BLOWER INLET TEMP.    43 DEG. C
     BAG NO.                                          1             2              3
     BLOWER REVOLUTIONS                           10358         17810          10361
     ROLL COUNTS                                   3486          3833           3506
     HC    SAMPLE  METER READING/SCALE           21.4/3        28.9/2         35.8/2
     HC    SAMPLE  PPM                             214            29             36
     HC    BACKGRD METER READING/SCALE            1.3/3        13.9/2         13.8/2
     HC    BACKGRD PPM                              13            14             14
     CO    SAMPLE  METER READING/SCALE           86.8/*        54.3/*         53.8/*
     CO    SAMPLE  PPM                             418            55             52
     CO    BACKGRD METER READING/SCALE            2.4/*         3.9/*          2.5/*
     CO    BACKGRD PPM                               7             4              3
     CO2   SAMPLE  METER READING/SCALE           37.8/3        28.3/3         33.9/3
     CO2   SAMPLE  PERCENT                         .64           .47            .57
     CO2   BACKGRD METER READING/SCALE            3.9/3         4.0/3          3.8/3
     CO2   BACKGRD PERCENT                         .06           .06            .06
     NOX   SAMPLE  METER READING/SCALE           15.0/2         2.9/2         12.9/2
     NOX   SAMPLE  PPM                            15.0           2.9           12.9
     NOX   BACKGRD METER READING/SCALE             .9/2          .6/2           .5/2
     NOX   BACKGRD PPM                              .9            .6             .5
     SO2   SAMPLE  METER READING/SCALE          -0.0/*        -0.0/*         -0.0/*
     SO2   SAMPLE  PPM                             0.0           0.0            0.0
     SO2   BACKGRD METER READING/SCALE          -0.0/*        -0.0/*         -0.0/*
     SO2   BACKGRD PPM                             0.0           0.0            0.0

     HC    CONCENTRATION PPM                       202            15             23
     CO    CONCENTRATION PPM                       399            50             48
     CO2   CONCENTRATION PCT                       .58           .41            .51
     NOX   CONCENTRATION PPM                      14.1           2.3           12.4
     SO2   CONCENTRATION PPM                       0.0           0.0            0.0
     HC    MASS GRAMS                             7.51           .99            .84
     CO    MASS GRAMS                            30.01          6.42           3.61
     CO2   MASS GRAMS                           688.81        829.17         605.49
     NOX   MASS GRAMS                             2.09           .59           1.84
     SO2   MASS GRAMS                             0.00          0.00           0.00
     TOTAL CARBON GRAMS                         207.36        229.91         167.53

     WEIGHTED MASS HC        .39 GRAMS/KILOMETRE
     WEIGHTED MASS CO       1.75 GRAMS/KILOMETRE
     WEIGHTED MASS CO2    120.68 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .21 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       12.19 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  18.8  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST               604.79 GRAMS
     ESTIMATED FUEL WEIGHT =   .70KG.
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      TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 800

DATE  8/ 8/77                 TIME    -0 HRS.         TEST NO.  1
MODEL  1976 KZ-900 FET LN+CDI+PL+CAT+AIR              ENGINE  .9 LITRE  4
DRIVER   KN                   TEST WT.      0 KG.     GVW    0 KG
WET BULB TEMP  23 C           DRY BULB TEMP  32 C     REL. HUM.  46.7 PCT
SPEC. HUM.  14.0 GRAM/KG      BARO.  739.1 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION            12.77 MINUTES
  BLOWER INLET PRESS. 1447.8  MM. H20
  BLOWER DIF.  PRESS. 1612.9  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9895
  DISTANCE TRAVELED   16.45  KILOMETRES
  BLOWER REVOLUTIONS    15705
  BLOWER CU. CM /REV.  8066

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                  24.9/2
   HC   SAMPLE  PPM                                     25
   HC   BACKGRD METER READING/SCALE                  13.3/2
   HC   BACKGRD PPM                                     13
   CO   SAMPLE  METER READING/SCALE                  24.8/*
   CO   SAMPLE  PPM                                     23
   CO   BACKGRD METER READING/SCALE                   1.9/*
   CO   BACKGRD PPM                                      2
   CO2  SAMPLE  METER READING/SCALE                  49.3/3
   CO2  SAMPLE  PERCENT                                .85
   CO2  BACKGRD METER READING/SCALE                   3.0/3
   CO2  BACKGRD PERCENT                                .05
   NOX  SAMPLE  METER READING/SCALE                  34.4/2
   NOX  SAMPLE  PPM                                  34.4
   NOX  BACKGRD METER READING/SCALE                    .8/2
   NOX  BACKGRD PPM                                     .8
   HC   CONCENTRATION PPM                               12
   CO   CONCENTRATION PPM                               20
   CO2  CONCENTRATION PCT                              .81
   NOX  CONCENTRATION PPM                             33.7
   SO2  COCENTRATION PPM                               0.0
   HC   MASS (GRAMS)                                   .70
   CO   MASS (GRAMS)                                  2.28
   CO2  MASS (GRAMS)                               1456.10
   NOX  MASS (GRAMS)                                  7.06
   SO2  MASS (GRAMS)                                  0.00

 HC   GRAMS/KILOMETRE      .04
 CO   GRAMS/KILOMETRE      .14
 CO2  GRAMS/KILOMETRE    88.53
 NOX  GRAMS/KILOMETRE      .43
 SO2  GRAMS/KILOMETRE     0.00

 HC   GRAMS/KG OF FUEL   1.52      HC   GRAMS/MIN     .05
 CO   GRAMS/KG OF FUEL    5.0      CO   GRAMS/MIN      .2
 CO2  GRAMS/KG OF FUEL   3157      CO2  GRAMS/MIN     114
 NOX  GRAMS/KG OF FUEL  15.30      NOX  GRAMS/MIN     .55
 SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                      26.20  KILOMETRES/LITRE
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                 TABLE                          VEHICLE EMISSION RESULTS
                                          1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800        TEST NO. 2          DATE  8/ 9/77                          MFGR. CODE    -0
VEHICLE MODEL  KZ900 LN+PL+CAT+ CDI+AIR  ENGINE    .90 LITRE 4                  CURB WT.      0 KG                  YR.  1976
                                                                                                                    GVW      0 KG
BAROMETER 742.44 MM OF HG.
DRY BULB TEMP.    29.4 DEG. C                                                 WET BULB TEMP  22.8 DEG. C
REL. HUMIDITY       57 PCT.                                                   ABS. HUMIDITY  14.9 GRAMS/KG
                                                                              DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, *12.9 MM. H20                                     BLOWER INLET PRESS., G1 *47.8 MM. H20
    BAG RESULTS                                                               BLOWER INLET TEMP.    43 DEG. C
    BAG NO.
    BLOWER REVOLUTIONS                                  1             2             3
    ROLL COUNTS                                     10350         17851         10385
    HC   SAMPLE  METER READING/SCALE                 3495          3805          3477
    HC   SAMPLE  PPM                               22.2/3        30.7/2        36.4/2
    HC   BACKGRD METER READING/SCALE                  222            31            36
    HC   BACKGRD PPM                                1.7/3         1.5/3        11.4/2
    CO   SAMPLE  METER READING/SCALE                   17            15            11
    CO   SAMPLE  PPM                               94.5/*        54.0/*        59.4/*
    CO   BACKGRD METER READING/SCALE                  485            52            58
    CO   BACKGRD PPM                                2.5/*         1.1/*         2.4/*
    CO2  SAMPLE  METER READING/SCALE                    8             3             2
    CO2  SAMPLE  PERCENT                           37.3/3        28.7/3        34.5/3
    CO2  BACKGRD METER READING/SCALE                  .63           .47           .58
    CO2  BACKGRD PERCENT                            3.3/3         4.0/3         4.0/3
    NOX  SAMPLE  METER READING/SCALE                  .05           .06           .06
    NOX  SAMPLE  PPM                               15.9/2         4.0/2        13.1/2
    NOX  BACKGRD METER READING/SCALE                 15.9           4.0          13.1
    NOX  BACKGRD PPM                                1.0/2          .8/2          .9/2
    SO2  SAMPLE  METER READING/SCALE                  1.0            .8            .9
    SO2  SAMPLE  PPM                               -0.0/*        -0.0/*        -0.0/*
    SO2  BACKGRD METER READING/SCALE                  0.0           0.0           0.0
    SO2  BACKGRD PPM                               -0.0/*        -0.0/*        -0.0/*
                                                      0.0           0.0           0.0
    HC   CONCENTRATION PPM                            206            16            25
    CO   CONCENTRATION PPM                            464            48            54
    CO2  CONCENTRATION PCT                            .58           .41           .52
    NOX  CONCENTRATION PPM                           15.0           3.2          12.2
    SO2  CONCENTRATION PPM                            0.0           0.0           0.0
    HC   MASS GRAMS                                  7.69          1.05           .96
    CO   MASS GRAMS                                 34.94          6.18          4.12
    CO2  MASS GRAMS                                690.36        848.76        618.66
    NOX  MASS GRAMS                                  2.15           .80          1.77
    SO2  MASS GRAMS                                  0.00          0.00          0.00
    TOTAL CARBON GRAMS                             210.05        235.20        171.44

    WEIGHTED MASS HC        .40 GRAMS/KILOMETRE
    WEIGHTED MASS CO       1.94 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    123.65 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .23 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.12 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  18.3  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST            616.68 GRAMS
    ESTIMATED FUEL WEIGHT =   .71KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 800

DATE  8/ 9/77               TIME     -0 HRS.        TEST NO.  2
MODEL  1976 KZ-900 FET LN+CDI+PL+CAT+AIR            ENGINE  .9 LITRE  4
DRIVER   KN                 TEST WT.      0 KG.     GVW    0 KG
WET BULB TEMP  22 C         DRY BULB TEMP  30 C     REL. HUM.  48.0 PCT
SPEC. HUM.  13.1 GRAM/KG    BARO.  738.9 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION            12.76 MINUTES
  BLOWER INLET PRESS. 1947.8  MM. H20
  BLOWER DIF.  PRESS. 1625.6  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9875
  DISTANCE TRAVELED   16.41  KILOMETRES
  BLOWER REVOLUTIONS    15695
  BLOWER CU. CM /REV.  8059

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE              35.1/2
   HC  SAMPLE  PPM                                35
   HC  BACKGRD METER READING/SCALE              11.1/2
   HC  BACKGRD PPM                                11
   CO  SAMPLE  METER READING/SCALE              89.1/*
   CO  SAMPLE  PPM                                87
   CO  BACKGRD METER READING/SCALE               1.8/*
   CO  BACKGRD PPM                                 2
   CO2 SAMPLE  METER READING/SCALE              50.4/3
   CO2 SAMPLE  PERCENT                           .87
   CO2 BACKGRD METER READING/SCALE               4.0/3
   CO2 BACKGRD PERCENT                           .06
   NOX SAMPLE  METER READING/SCALE              33.9/2
   NOX SAMPLE  PPM                              33.9
   NOX BACKGRD METER READING/SCALE               1.0/2
   NOX BACKGRD PPM                               1.0
   HC  CONCENTRATION PPM                          25
   CO  CONCENTRATION PPM                          83
   CO2 CONCENTRATION PCT                         .82
   NOX CONCENTRATION PPM                        33.0
   SO2 COCENTRATION PPM                         0.0
   HC  MASS (GRAMS)                             1.39
   CO  MASS (GRAMS)                             9.37
   CO2 MASS (GRAMS)                          1465.65
   NOX MASS (GRAMS)                             6.67
   SO2 MASS (GRAMS)                             0.00

 HC  GRAMS/KILOMETRE       .08
 CO  GRAMS/KILOMETRE       .57
 CO2 GRAMS/KILOMETRE     89.29
 NOX GRAMS/KILOMETRE       .41
 SO2 GRAMS/KILOMETRE      0.00

 HC  GRAMS/KG OF FUEL   2.97     HC  GRAMS/MIN     .11
 CO  GRAMS/KG OF FUEL   20.0     CO  GRAMS/MIN      .7
 CO2 GRAMS/KG OF FUEL   3129     CO2 GRAMS/MIN     115
 NOX GRAMS/KG OF FUEL  14.24     NOX GRAMS/MIN     .52
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                     25.79  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda XL-125

Date 2/14/77 Sequence XLS-1 Base Repeat (initial baseline given in Appendix E)

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1,600	----	4.85	9.18	4.4	44.	5,320
20	2	7,080	0.43	8.01	10.18	0.6	145.	4,960
30	4	6,000	0.98	7.71	10.40	0.5	265.	4,560
40	5	6,560	1.70	7.95	10.33	0.4	435.	5,360
50	5	8,100	2.81	3.57	12.62	0.5	2125.	3,460
Idle	N	-----	----	5.04	8.78	4.5	43.	4,560

Notes: Pilot air screw - as received. After carburetor inspection & cleaning
Max. head temp. at 50 mph 210°C
Max. gas temp. at 50 mph 820°C at station #1

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda XL-125

Date 2/16/77 Sequence XLS-2 with air pump

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1,600	----	3.17	8.88	6.8	29.	3,060
20	2	7,080	0.41	6.88	9.18	2.2	122.	4,120
30	4	6,000	0.95	8.01	9.25	2.0	325.	4,320
40	5	6,560	1.73	5.49	11.04	1.7	1240.	3,080
50	5	8,100	2.85	4.22	12.02	1.4	2500.	3,300
Idle	N	----	----	4.07	8.56	6.3	47.	2,780

Notes: Max head temp reached @ 50 mph - approx. 250°C
Max gas temp @ 50 mph 790°C
No reaction apparent. Air pump No. 0533 , 1:1 ratio off camshaft, 1:2 (pump:crank)

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda XL-125

Date 3/16/77 Sequence XLS-3

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	-	-	2.25	9.70	6.3	33	3,440	
20	2	-	0.47	3.34	13.11	0.8	115	900	reaction by CO_2 & temp.
30	4	-	1.04	5.04	11.50	1.4	225	1,940	" " " "
40	5	-	1.81	5.23	10.66	2.3	635	2,220	reaction by temp.
50	5	-	3.02	3.48	11.70	2.3	2400	2,740	dilution only
Idle	N	-	-	2.79	9.80	5.8	44	2,020	

Notes: Conducted with air pump No. 1033 @ 1:2 ratio drive
Max. head temp. at 50 mph - 230°C
Max. gas temp. occurred at 20 mph ∿ 825°C, gas temp at 50 mph - 790°C

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda, XL-125

Date 4/01/77 Sequence XLS-4 Pump drive Ratio 1.33:2

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Exhaust Gas Temp. °C
Idle	N	1800	----	1.15	8.78	8.8	34.	1,600	560° at #1
20	2	7080	0.48	1.18	13.83	1.0	100.	140	>825° at #1 #2, 825°# 3
30	4	6000	0.99	3.67	11.63	2.2	235.	1,030	760° at #1, > 825° at 2, 650°#3
40	5	6560	1.79	4.50	10.16	3.2	780.	1,840	720° at #1, 750°@#2, 650°@#3
50	5	8100	2.78	2.71	11.50	3.1	1310.	2,160	780° at #1, 790°@#2, 740°@#3
Idle	N	1800	----	1.15	8.98	8.7	42.	1,000	560° at #1, 490°@#2, 340°@#3

Notes: timing checked before run - OK
max. head temp ≈ 240°C occurring at 50mph
WOT 0-80 kph = 11,8 sec.
WOT 0-100 kph = 38.0 sec.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda, XL-125

Date 4/07/77 Sequence XLS-5a w/out air

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N		----	2.56	10.33	4.9	45.	3,560
20	2		0.44	8.12	9.75	0.6	130.	4,040
30	4		1.01	7.42	10.33	0.4	355.	3,800
40	5		1.79	6.12	11.33	0.3	930.	3,280
50	5		2.82	3.39	12.91	0.5	2850.	3,120
Idle	N		----	3.26	10.44	4.5	58.	3,060

Notes: Chevette reed valve added - air entrance blocked

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda, XL-125

Date 4/07/77 Sequence XLS-5b w/ air Chevette Reed

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1800	----	1.15	8.59	8.8	25.	1,560	reaction by Δt +
20	2	7080	0.44	7.52	9.80	1.1	120.	3,360	reaction by Δt +
30	4	6000	1.01	9.62	8.78	0.8	195.	4,400	dilution by Δt -
40	5	6560	1.79	5.70	10.99	1.0	875.	2,960	dilution by Δt -
50	5	8100	2.82	3.39	12.38	1.3	2600.	2,920	dilution by Δt -
Idle	N	1800	----	1.18	8.49	8.9	30.	960	reaction by Δt +

Notes:

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda XL-125

Date 5/9/77 Sequence XLS-6

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	----	----	1.60	10.08	6.3	33.	12,200	no air added
20	2	----	0.47	4.07	12.38	0.6	175.	5,280	
30	4	----	1.03	5.92	11.56	0.2	305.	4,360	
40	5	----	1.80	4.61	12.37	0.2	960.	3,750	
50	5	----	2.99	3.08	13.11	0.3	1525.	3,880	
Idle	N	----	----	1.30	10.44	6.0	41.	10,400	

Notes: No air added, Mototek CDI system added, carburetor cleaned and leaned out
Jet needle clip position changed from 2 to 1 ; pilot air screw was 1 now 1-1/8
Timing advanced approx. 7° to make up for underadvancement of Motek system
Max. head temp. - 190°C at 50 mph
Max. exhaust gas temp - ≥825°C at station #1, pipe insulated for air injection

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda XL-125

Date 5/9/77 Sequence XLS-7

Conditon				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	----	----	0.70	8.15	9.4	34.	7,040	probable dilution
20	2	----	0.47	0.70	13.49	1.9	145.	172	probable reaction
30	4	----	1.02	3.43	11.82	2.0	240.	1,140	probable reaction
40	5	----	1.79	3.43	11.33	2.7	860.	1,620	probable minor reaction
50	5	----	2.96	2.26	12.82	1.5	1480.	792	probable reaction
Idle	N	----	----	0.62	8.30	9.3	39.	6,400	probable dilution

Notes: Air added by pump 1033 at 1.33:2, + Mototek CDI at carburetor enleanment
Carburetor set as for XLS-6, timing as for XLS-6
Max. head temp. - 230°C at 50 mph
Max. exhaust gas temp. exceeds 825°C at station #2 (downstream of air injection) at speeds of 20, 30, and 50 mph; at 40 mph station = 825°C
Very good thermal reaction noted from temperature data
WOT accel. time 0 - 80 kph, 11.5 sec
WOT accel. time 0 - 100 kph + would not exceed 97.5 kph - reached 29.2 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda XL-125

Date 8/4/77 Sequence XLS-8

Condition				Concentrations					Exhaust Temp, °C			Air Injection Rate, cfm
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Exit Head	Enter Cat.	Exit Cat.	
Idle	N	1150	--	0.004	9.91	6.9	41.	158	525	430	450	0.60
20	2	--	0.49	0.014	12.20	3.6	195.	21	770	750	650	1.88
30	4	--	1.00	0.22	14.48	0.2	160.	21	630	875	840	1.62
40	5	--	1.79	0.19	14.18	0.7	865.	45	680	650	850	1.86
50	5	--	2.80	0.26	13.75	1.1	2,200.	97	760	765	820	2.22
Idle	N	1200	--	0.005	9.91	6.8	47.	100				

Notes: Lean Carburetor; stock ignition and timing; air injection pump No. 1533 (1.33:2); catalyst PTX 313, all Corning

Max. head temp 250°C

W.O.T. 0-80 kph accel time = 11.8 sec

Note: temperature data indicate reaction occurring in head or pipe about 6 inches downstream of exhaust port.

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                          TABLE
                                              VEHICLE EMISSION RESULTS
UNIT NO.  200        TEST NO. 1          1975  LIGHT DUTY EMISSIONS TEST
VEHICLE MODEL  HONDA XL125           DATE 10/ 7/76                         MFGR. CODE   -0
                                     ENGINE     .13 LITRE 1                CURR WT.     0 KG                   YR.  1976
BAROMETER 741.93 MM OF HG.                                                                                    GVM      0 KG
DRY BULB TEMP.    25.6 DEG. C                                         WET BULB TEMP  18.9 DEG. C
REL. HUMIDITY      53 PCT.                                            ABS. HUMIDITY  11.1 GRAMS/KG
                                                                      DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 304.8 MM, H2O                             BLOWER INLET PRESS., G1 254.0 MM, H2O
    BAG RESULTS                                                       BLOWER INLET TEMP.   43 DEG. C
    BAG NO.
    BLOWER REVOLUTIONS                              1               2               3
    ROLL COUNTS                                  3528            6050            3531
    HC    SAMPLE   METER READING/SCALE           2766            3688            2789
    HC    SAMPLE   PPM                         64.1/3          17.9/3          17.6/3
    HC    BACKGRD  METER READING/SCALE            641             179             176
    HC    BACKGRD  PPM                          1.7/3           1.8/3           1.9/3
    CO    SAMPLE   METER READING/SCALE             17              18              19
    CO    SAMPLE   PPM                         76.2/3          65.8/3          70.1/3
    CO    BACKGRD  METER READING/SCALE           2029            1688            1824
    CO    BACKGRD  PPM                           .3/3            .3/3            .9/3
    CO2   SAMPLE   METER READING/SCALE              6               6               9
    CO2   SAMPLE   PERCENT                     24.6/3          19.5/3          23.1/3
    CO2   BACKGRD  METER READING/SCALE            .44             .31             .37
    CO2   BACKGRD  PERCENT                      4.2/3           3.6/3           4.7/3
    NOX   SAMPLE   METER READING/SCALE            .06             .06             .07
    NOX   SAMPLE   PPM                         17.7/2           8.3/2          15.9/2
    NOX   BACKGRD  METER READING/SCALE           17.7             8.3            15.9
    NOX   BACKGRD  PPM                           .9/2            .8/2            .9/2
    SO2   SAMPLE   METER READING/SCALE             .9              .8              .9
    SO2   SAMPLE   PPM                         -0.0/*          -0.0/*          -0.0/*
    SO2   BACKGRD  METER READING/SCALE            0.0             0.0             0.0
    SO2   BACKGRD  PPM                         -0.0/*          -0.0/*          -0.0/*
                                                  0.0             0.0             0.0
    HC    CONCENTRATION PPM
    CO    CONCENTRATION PPM                       625             162             163
    CO2   CONCENTRATION PCT                      1972            1643            1772
    NOX   CONCENTRATION PPM                       .37             .26             .31
    SO2   CONCENTRATION PPM                      16.8             7.5            15.0
    HC    MASS GRAMS                              0.0             0.0             0.0
    CO    MASS GRAMS                             8.97            3.98            2.39
    CO2   MASS GRAMS                            57.16           81.68           51.40
    NOX   MASS GRAMS                           171.44          204.15          139.98
    SO2   MASS GRAMS                              .81             .62             .73
    TOTAL CARBON GRAMS                           0.00            0.00            0.00
                                                74.07           99.19           62.27

    WEIGHTED MASS HC        .85 GRAMS/KILOMETRE
    WEIGHTED MASS CO      12.61 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     33.27 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .13 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        10.75 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  42.3  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST                235.52 GRAMS
    ESTIMATED FUEL WEIGHT =    .27KG.
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     TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 200

DATE 10/14/76              TIME     -0 HRS.         TEST NO.  1
MODEL  1976 HONDA XL-125   HIWAY CYCLE              ENGINE  .1 LITRE  1
DRIVER   TJ                TEST WT.      0 KG.      GVW     0 KG
WET BULB TEMP  19 C        DRY BULB TEMP  28 C      REL. HUM.  42.6 PCT
SPFC. HUM.  10.2 GRAM/KG   BARO.  740.2 MM  HG.     MEASURED FUEL  0.00 KG

 RUN DURATION           12.76 MINUTES
 BLOWER INLET PRESS.  241.3  MM. H2O
 BLOWER DIF.  PRESS.  266.7  MM  H2O
 BLOWER INLET TEMP.      43  DEG. C
 DYNO REVOLUTIONS     10006
 DISTANCE TRAVELED    16.63  KILOMETRES
 BLOWER REVOLUTIONS      5325
 BLOWER CU. CM /REV.  8135

 BAG RESULTS
  HC   SAMPLE  METER READING/SCALE               37.1/3
  HC   SAMPLE  PPM                                371
  HC   BACKGRD METER READING/SCALE                1.4/3
  HC   BACKGRD PPM                                 14
  CO   SAMPLE  METER READING/SCALE               58.6/2
  CO   SAMPLE  PPM                               2999
  CO   BACKGRD METER READING/SCALE                 .1/2
  CO   BACKGRD PPM                                  4
  CO2  SAMPLE  METER READING/SCALE               65.6/3
  CO2  SAMPLE  PERCENT                           1.18
  CO2  BACKGRD METER READING/SCALE                2.6/3
  CO2  BACKGRD PERCENT                            .04
  NOX  SAMPLE  METER READING/SCALE               72.1/3
  NOX  SAMPLE  PPM                              216.3
  NOX  BACKGRD METER READING/SCALE                 .4/3
  NOX  BACKGRD PPM                                1.2
  HC   CONCENTRATION PPM                          359
  CO   CONCENTRATION PPM                         2886
  CO2  CONCENTRATION PCT                         1.14
  NOX  CONCENTRATION PPM                        215.2
  SO2  COCENTRATION PPM                          0.0
  HC   MASS (GRAMS)                              7.89
  CO   MASS (GRAMS)                            128.19
  CO2  MASS (GRAMS)                            799.42
  NOX  MASS (GRAMS)                             15.43
  SO2  MASS (GRAMS)                              0.00

 HC   GRAMS/KILOMETRE       .47
 CO   GRAMS/KILOMETRE      7.71
 CO2  GRAMS/KILOMETRE     48.06
 NOX  GRAMS/KILOMETRE       .43
 SO2  GRAMS/KILOMETRE      0.00

 HC   GRAMS/KG OF FUEL  24.37     HC   GRAMS/MIN    .62
 CO   GRAMS/KG OF FUEL  396.0     CO   GRAMS/MIN   10.0
 COP  GRAMS/KG OF FUEL   2470     CO2  GRAMS/MIN     63
 NOX  GRAMS/KG OF FUEL  47.66     NOX  GRAMS/MIN   1.21
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY
                                              37.75  KILOMETRES/LITRE
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                         TABLE                          VEHICLE EMISSION RESULTS
                                                  1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  200        TEST NO. 2         DATE 10/ 8/76                           MFGR. CODE   -0                     YR.  1976
VEHICLE MODEL  HONDA XL 125             ENGINE     .13 LITRE 1                  CURB WT.     0 KG                   GVW      0 KG

BAROMETER 748.79 MM OF HG.                                               WET BULB TEMP  13.9 DEG. C
DRY BULB TEMP.   22.8 DEG. C                                             ABS. HUMIDITY   6.2 GRAMS/KG
REL. HUMIDITY     36 PCT.                                                DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 266.7 MM. H20                                BLOWER INLET PRESS., G1 241.3 MM. H20
    BAG RESULTS                                                          BLOWER INLET TEMP.   43 DEG. C
    BAG NO.                                    1               2               3
    BLOWER REVOLUTIONS                       3516            6046            3529
    ROLL COUNTS                              2812            3767            2821
    HC   SAMPLE  METER READING/SCALE         39.4/3          17.5/3          16.1/3
    HC   SAMPLE  PPM                         394             175             161
    HC   BACKGRD METER READING/SCALE         1.6/3           1.4/3           1.1/3
    HC   BACKGRD PPM                         16              14              11
    CO   SAMPLE  METER READING/SCALE         61.4/3          57.9/3          59.4/3
    CO   SAMPLE  PPM                         1555            1453            1496
    CO   BACKGRD METER READING/SCALE         .7/3            .9/3            .5/3
    CO   BACKGRD PPM                         15              19              11
    CO2  SAMPLE  METER READING/SCALE         28.7/3          21.3/3          23.4/3
    CO2  SAMPLE  PERCENT                     .47             .34             .38
    CO2  BACKGRD METER READING/SCALE         3.7/3           3.8/3           3.4/3
    CO2  BACKGRD PERCENT                     .06             .06             .05
    NOX  SAMPLE  METER READING/SCALE         23.3/2          10.2/2          17.1/2
    NOX  SAMPLE  PPM                         23.3            10.2            17.1
    NOX  BACKGRD METER READING/SCALE         1.5/2           1.0/2           .8/2
    NOX  BACKGRD PPM                         1.5             1.0             .8
    SO2  SAMPLE  METER READING/SCALE         -0.0/*          -0.0/*          -0.0/*
    SO2  SAMPLE  PPM                         0.0             0.0             0.0
    SO2  BACKGRD METER READING/SCALE         -0.0/*          -0.0/*          -0.0/*
    SO2  BACKGRD PPM                         0.0             0.0             0.0

    HC   CONCENTRATION PPM                   379             162             150
    CO   CONCENTRATION PPM                   1509            1408            1458
    CO2  CONCENTRATION PCT                   .42             .29             .33
    NOX  CONCENTRATION PPM                   21.9            9.2             16.3
    SO2  CONCENTRATION PPM                   0.0             0.0             0.0
    HC   MASS GRAMS                          5.58            4.09            2.22
    CO   MASS GRAMS                          44.83           71.93           43.48
    CO2  MASS GRAMS                          196.47          232.16          155.39
    NOX  MASS GRAMS                          .93             .68             .70
    SO2  MASS GRAMS                          0.00            0.00            0.00
    TOTAL CARBON GRAMS                       77.67           97.75           62.98

    WEIGHTED MASS HC        .71 GRAMS/KILOMETRE
    WEIGHTED MASS CO      10.60 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     37.03 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .13 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        10.95 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  42.2  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST             238.40 GRAMS
    ESTIMATED FUEL WEIGHT =   .28KG.
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     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMBER 200

DATE 10/14/76             TIME     -0 HRS.         TEST NO.  2
MODEL  1976 HONDA XL-125  HIWAY CYCLE              ENGINE  .1 LITRE  1
DRIVER   TJ               TEST WT.       0 KG.     GVW     0 KG
WET BULB TEMP  19 C       DRY BULB TEMP  25 C      REL. HUM.  56.0 PCT
SPEC. HUM.  11.4 GRAM/KG  BARO.  740.2 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION           12.73 MINUTES
  BLOWER INLET PRESS.   254.0  MM. H2O
  BLOWER DIF.  PRESS.   266.7  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS       9856
  DISTANCE TRAVELED    16.38  KILOMETRES
  BLOWER REVOLUTIONS      5313
  BLOWER CU. CM /REV.  8134

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              34.3/3
   HC   SAMPLE  PPM                               343
   HC   BACKGRD METER READING/SCALE               1.7/3
   HC   BACKGRD PPM                                17
   CO   SAMPLE  METER READING/SCALE              63.0/2
   CO   SAMPLE  PPM                              3327
   CO   BACKGRD METER READING/SCALE                .5/2
   CO   BACKGRD PPM                                19
   CO2  SAMPLE  METER READING/SCALE              65.1/3
   CO2  SAMPLE  PERCENT                          1.16
   CO2  BACKGRD METER READING/SCALE               2.7/3
   CO2  BACKGRD PERCENT                           .04
   NOX  SAMPLE  METER READING/SCALE              71.8/3
   NOX  SAMPLE  PPM                             215.4
   NOX  BACKGRD METER READING/SCALE               1.5/3
   NOX  BACKGRD PPM                               4.5
   HC   CONCENTRATION PPM                         328
   CO   CONCENTRATION PPM                        3175
   CO2  CONCENTRATION PCT                        1.13
   NOX  CONCENTRATION PPM                       211.4
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                             7.19
   CO   MASS (GRAMS)                           140.50
   CO2  MASS (GRAMS)                           788.53
   NOX  MASS (GRAMS)                            15.71
   SO2  MASS (GRAMS)                             0.00

HC   GRAMS/KILOMETRE       .44
CO   GRAMS/KILOMETRE      8.58
CO2  GRAMS/KILOMETRE     48.13
NOX  GRAMS/KILOMETRE       .96
SO2  GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL  22.07     HC   GRAMS/MIN    .56
CO   GRAMS/KG OF FUEL  431.5     CO   GRAMS/MIN   11.0
CO2  GRAMS/KG OF FUEL   2421     CO2  GRAMS/MIN     62
NOX  GRAMS/KG OF FUEL  48.24     NOX  GRAMS/MIN   1.23
SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                    36.96  KILOMETRES/LITRE
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TABLE VEHICLE EMISSION RESULTS

1975 LIGHT DUTY EMISSIONS TEST

UNIT NO. 200 TEST NO. 1
VEHICLE MODEL XL-125 BASE RTN
DATE 1/28/77
ENGINE .13 LITRE 1
MFGR. CODE -0
CURB WT. 0 KG
YR. 1976
GVW 0 KG

BAROMETER 736.60 MM OF HG.
DRY BULB TEMP. 23.3 DEG. C
REL. HUMIDITY 24 PCT.
WET BULB TEMP 12.2 DEG. C
ABS. HUMIDITY 4.4 GRAMS/KG
DYNO ROLL CONSTANT 967.97

EXHAUST EMISSIONS

BLOWER DIF. PRESS., G2, 254.0 MM. H2O
BLOWER INLET PRESS., G1 228.6 MM. H2O
BLOWER INLET TEMP. 43 DEG. C

BAG RESULTS

BAG NO.	1	2	3
BLOWER REVOLUTIONS	3580	6044	3529
ROLL COUNTS	2827	3780	2830
HC SAMPLE METER READING/SCALE	36.0/3	18.4/3	17.6/3
HC SAMPLE PPM	360	184	176
HC BACKGRD METER READING/SCALE	1.3/3	1.7/3	1.5/3
HC BACKGRD PPM	13	17	15
CO SAMPLE METER READING/SCALE	62.7/3	70.5/3	68.2/3
CO SAMPLE PPM	1594	1837	1763
CO BACKGRD METER READING/SCALE	.3/3	.2/3	.1/3
CO BACKGRD PPM	6	4	2
CO2 SAMPLE METER READING/SCALE	28.5/3	20.8/3	23.7/3
CO2 SAMPLE PERCENT	.47	.34	.39
CO2 BACKGRD METER READING/SCALE	1.9/3	2.0/3	3.2/3
CO2 BACKGRD PERCENT	.03	.03	.05
NOX SAMPLE METER READING/SCALE	27.8/2	10.5/2	21.8/2
NOX SAMPLE PPM	27.8	10.5	21.8
NOX BACKGRD METER READING/SCALE	.4/2	.4/2	.3/2
NOX BACKGRD PPM	.4	.4	.3
SO2 SAMPLE METER READING/SCALE	-0.0/*	-0.0/*	-0.0/*
SO2 SAMPLE PPM	0.0	0.0	0.0
SO2 BACKGRD METER READING/SCALE	-0.0/*	-0.0/*	-0.0/*
SO2 BACKGRD PPM	0.0	0.0	0.0
HC CONCENTRATION PPM	348	168	162
CO CONCENTRATION PPM	1561	1807	1734
CO2 CONCENTRATION PCT	.44	.31	.34
NOX CONCENTRATION PPM	27.4	10.1	21.5
SO2 CONCENTRATION PPM	0.0	0.0	0.0
HC MASS GRAMS	5.38	4.38	2.46
CO MASS GRAMS	48.74	95.23	53.38
CO2 MASS GRAMS	217.71	254.69	164.36
NOX MASS GRAMS	1.16	.73	.90
SO2 MASS GRAMS	0.00	0.00	0.00
TOTAL CARBON GRAMS	84.97	114.14	69.88

WEIGHTED MASS HC .74 GRAMS/KILOMETRE
WEIGHTED MASS CO 13.35 GRAMS/KILOMETRE
WEIGHTED MASS CO2 40.23 GRAMS/KILOMETRE
WEIGHTED MASS NOX .16 GRAMS/KILOMETRE
WEIGHTED MASS SO2 0.00 GRAMS/KILOMETRE

ACTUAL DISTANCE 10.99 KILOMETRE

FUEL ECONOMY BY CARBON BALANCE = 37.2 KILOMETRE/LITRE
TOTAL CARBON EXHAUST 268.98 GRAMS
ESTIMATED FUEL WEIGHT = .31KG.

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        TABLE       EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                               VEHICLE NUMBER 200

DATE  1/31/77             TIME     -0 HRS.            TEST NO.  2
MODEL  1976 HONDA XL 125  FET  BASE RTN               ENGINE  .1 LITRE  1
DRIVER   KN               TEST WT.       0 KG.        GVW     0 KG
WET BULB TEMP  11 C       DRY BULB TEMP  22 C         REL. HUM.  20.5 PCT
SPFC. HUM.    3.3 GRAM/KG BARO.  750.8 MM  HG.        MEASURED FUEL  0.00 KG

  RUN DURATION           12.75 MINUTES
  BLOWER INLET PRESS.   228.6  MM. H2O
  BLOWER DIF.  PRESS.   254.0  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS      10003
  DISTANCE TRAVELED     16.63  KILOMETRES
  BLOWER REVOLUTIONS       5324
  BLOWER CU. CM /REV.   8556

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                 40.9/3
   HC   SAMPLE  PPM                                 409
   HC   BACKGRD METER READING/SCALE                  1.5/3
   HC   BACKGRD PPM                                  15
   CO   SAMPLE  METER READING/SCALE                 61.2/2
   CO   SAMPLE  PPM                                 3190
   CO   BACKGRD METER READING/SCALE                   .2/2
   CO   BACKGRD PPM                                   8
   CO2  SAMPLE  METER READING/SCALE                 65.2/3
   CO2  SAMPLE  PERCENT                             1.17
   CO2  BACKGRD METER READING/SCALE                  3.7/3
   CO2  BACKGRD PERCENT                              .06
   NOX  SAMPLE  METER READING/SCALE                 56.9/3
   NOX  SAMPLE  PPM                                170.7
   NOX  BACKGRD METER READING/SCALE                   .3/3
   NOX  BACKGRD PPM                                  .9
   HC   CONCENTRATION PPM                           396
   CO   CONCENTRATION PPM                          3091
   CO2  CONCENTRATION PCT                          1.12
   NOX  CONCENTRATION PPM                         169.9
   SO2  COCENTRATION PPM                           0.0
   HC   MASS (GRAMS)                               9.30
   CO   MASS (GRAMS)                             196.67
   CO2  MASS (GRAMS)                             836.84
   NOX  MASS (GRAMS)                              10.65
   SO2  MASS (GRAMS)                               0.00

 HC   GRAMS/KILOMETRE      .56
 CO   GRAMS/KILOMETRE     8.82
 CO2  GRAMS/KILOMETRE    50.33
 NOX  GRAMS/KILOMETRE      .69
 SO2  GRAMS/KILOMETRE     0.00

 HC   GRAMS/KG OF FUEL  26.87    HC   GRAMS/MIN    .73
 CO   GRAMS/KG OF FUEL 423.8     CO   GRAMS/MIN  11.5
 CO2  GRAMS/KG OF FUEL   2418    CO2  GRAMS/MIN    66
 NOX  GRAMS/KG OF FUEL  30.78    NOX  GRAMS/MIN    .83
 SO2  GRAMS/KG OF FUEL   0.00    SO2  GRAMS/MIN  0.00
 CARBON BALANCE FUEL ECONOMY                   35.30  KILOMETRES/LITRE
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              TABLE                       VEHICLE EMISSION RESULTS
                                      1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  200        TEST NO. 1      DATE  3/28/77                MFGR. CODE   -0                YR.  1976
VEHICLE MODEL  XL-125 2ND STEP, AIR 1:2   ENGINE    .13 LITRE 1          CURB WT.     0 KG              GVW     0 KG

BAROMETER 731.52 MM OF HG.                                     WET BULB TEMP  15.6 DEG. C
DRY BULB TEMP.   26.1 DEG. C                                   ABS. HUMIDITY   6.9 GRAMS/KG
REL. HUMIDITY      32 PCT.                                     DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                               BLOWER INLET PRESS., G1 228.6 MM. H2O
   BLOWER DIF. PRESS., G2, 266.7 MM. H2O                        BLOWER INLET TEMP.    43 DEG. C
   BAG RESULTS
   BAG NO.                                    1             2             3
   BLOWER REVOLUTIONS                       3544          6037          3546
   ROLL COUNTS                              2853          3798          2897
   HC   SAMPLE  METER READING/SCALE        26.2/3        17.1/3        15.6/3
   HC   SAMPLE  PPM                         262           171           156
   HC   BACKGRD METER READING/SCALE         1.1/3         1.3/3         1.3/3
   HC   BACKGRD PPM                          11            13            13
   CO   SAMPLE  METER READING/SCALE        74.7/3        66.1/3        67.6/3
   CO   SAMPLE  PPM                        1977          1697          1744
   CO   BACKGRD METER READING/SCALE          .2/3          .6/3          .3/3
   CO   BACKGRD PPM                           4            13             6
   CO2  SAMPLE  METER READING/SCALE        25.6/3        21.1/3        23.7/3
   CO2  SAMPLE  PERCENT                      .42           .34           .39
   CO2  BACKGRD METER READING/SCALE         3.6/3         3.4/3         3.5/3
   CO2  BACKGRD PERCENT                      .06           .05           .05
   NOX  SAMPLE  METER READING/SCALE        22.2/2        10.0/2        19.7/2
   NOX  SAMPLE  PPM                         22.2          10.0          19.7
   NOX  BACKGRD METER READING/SCALE         1.0/2         1.2/2         1.2/2
   NOX  BACKGRD PPM                          1.0           1.2           1.2
   SO2  SAMPLE  METER READING/SCALE        -0.0/*        -0.0/*        -0.0/*
   SO2  SAMPLE  PPM                          0.0           0.0           0.0
   SO2  BACKGRD METER READING/SCALE        -0.0/*        -0.0/*        -0.0/*
   SO2  BACKGRD PPM                          0.0           0.0           0.0

   HC   CONCENTRATION PPM                   252           159           144
   CO   CONCENTRATION PPM                  1937          1657          1707
   CO2  CONCENTRATION PCT                    .37           .29           .33
   NOX  CONCENTRATION PPM                   21.2           8.8          18.6
   SO2  CONCENTRATION PPM                    0.0           0.0           0.0
   HC   MASS GRAMS                          3.80          4.08          2.17
   CO   MASS GRAMS                         59.05         86.02         52.08
   CO2  MASS GRAMS                        175.96        238.09        160.74
   NOX  MASS GRAMS                           .95           .67           .83
   SO2  MASS GRAMS                          0.00          0.00          0.00
   TOTAL CARBON GRAMS                      76.63        105.40         68.08

   WEIGHTED MASS HC       .63 GRAMS/KILOMETRE
   WEIGHTED MASS CO     12.77 GRAMS/KILOMETRE
   WEIGHTED MASS CO2    36.69 GRAMS/KILOMETRE
   WEIGHTED MASS NOX      .14 GRAMS/KILOMETRE
   WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE       11.05 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  40.2  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST              250.11 GRAMS
   ESTIMATED FUEL WEIGHT =   .29KG.
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     TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                         VEHICLE NUMBER 200

DATE  3/30/77               TIME      -0 HRS.          TEST NO.  1
MODEL  1976 HONDA XL-125 FET 2ND STEP, AIR 1:2         ENGINE  .1 LITRE  1
DRIVER   KN                 TEST WT.      0 KG.        GVW     0 KG
WET BULB TEMP  16 C         DRY BULB TEMP  27 C        REL. HUM.  29.4 PCT
SPEC. HUM.   6.5 GRAM/KG    BARO.  741.4 MM  HG.       MEASURED FUEL  0.00 KG

  RUN DURATION          12.75 MINUTES
  BLOWER INLET PRESS.  241.3  MM. H2O
  BLOWER DIF.  PRESS.  266.7  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9808
  DISTANCE TRAVELED    16.30  KILOMETRES
  BLOWER REVOLUTIONS     5284
  BLOWER CU. CM /REV.  8480

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                  33.2/3
   HC   SAMPLE  PPM                                   332
   HC   BACKGRD METER READING/SCALE                   1.5/3
   HC   BACKGRD PPM                                    15
   CO   SAMPLE  METER READING/SCALE                  73.7/2
   CO   SAMPLE  PPM                                  4194
   CO   BACKGRD METER READING/SCALE                    .3/2
   CO   BACKGRD PPM                                    11
   CO2  SAMPLE  METER READING/SCALE                  60.5/3
   CO2  SAMPLE  PERCENT                              1.07
   CO2  BACKGRD METER READING/SCALE                   3.0/3
   CO2  BACKGRD PERCENT                               .05
   NOX  SAMPLE  METER READING/SCALE                  57.5/3
   NOX  SAMPLE  PPM                                 172.5
   NOX  BACKGRD METER READING/SCALE                   .4/3
   NOX  BACKGRD PPM                                   1.2
   HC   CONCENTRATION PPM                             319
   CO   CONCENTRATION PPM                            4058
   CO2  CONCENTRATION PCT                            1.03
   NOX  CONCENTRATION PPM                           171.4
   SO2  COCENTRATION PPM                              0.0
   HC   MASS (GRAMS)                                 7.26
   CO   MASS (GRAMS)                               186.73
   CO2  MASS (GRAMS)                               750.15
   NOX  MASS (GRAMS)                                11.39
   SO2  MASS (GRAMS)                                 0.00

HC   GRAMS/KILOMETRE        .45
CO   GRAMS/KILOMETRE      11.45
CO2  GRAMS/KILOMETRE      46.01
NOX  GRAMS/KILOMETRE        .70
SO2  GRAMS/KILOMETRE       0.00

HC   GRAMS/KG OF FUEL  21.59     HC   GRAMS/MIN    .57
CO   GRAMS/KG OF FUEL  559.9     CO   GRAMS/MIN   14.6
CO2  GRAMS/KG OF FUEL   2229     CO2  GRAMS/MIN     59
NOX  GRAMS/KG OF FUEL  33.85     NOX  GRAMS/MIN    .89
SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                      35.59  KILOMETRES/LITRE
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                     TABLE                     VEHICLE EMISSION RESULTS
                                           1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  200        TEST NO. 1          DATE  4/ 4/77                     MFGR. CODE   -0                YR.  1976
VEHICLE MODEL  YL-125 2ND,1.33:2 AIR     ENGINE     .13 LITRE 1            CURB WT.       0 KG            GVM      0 KG

BAROMETER 738.17 MM OF HG.                                                 WET BULB TEMP  13.3 DEG. C
DRY BULB TEMP.    24.4 DEG. C                                              ABS. HUMIDITY   5.1 GRAMS/KG
REL. HUMIDITY       26 PCT.                                                DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                           BLOWER INLET PRESS., G1 228.6 MM. H2O
    BLOWER DIF. PRESS., G2, 259.0 MM. H2O                                  BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                        1              2              3
    BLOWER REVOLUTIONS                          3522           6040           3523
    ROLL COUNTS                                 2794           3789           2854
    HC   SAMPLF  METER READING/SCALE          22.1/3         14.8/3         13.4/3
    HC   SAMPLF  PPM                             221            148            134
    HC   BACKGRD METER READING/SCALE            .9/3          1.1/3          1.1/3
    HC   BACKGRD PPM                               9             11             11
    CO   SAMPLF  METER READING/SCALE          53.6/3         48.2/3         52.3/3
    CO   SAMPLF  PPM                            1330           1182           1294
    CO   BACKGRD METER READING/SCALE            .1/3           .1/3           .1/3
    CO   BACKGRD PPM                               2              2              2
    CO2  SAMPLF  METER READING/SCALE          27.7/3         23.5/3         25.7/3
    CO2  SAMPLE  PERCENT                         .45            .38            .42
    CO2  BACKGRD METER READING/SCALE           4.1/3          4.9/3          4.2/3
    CO2  BACKGRD PERCENT                         .06            .08            .06
    NOX  SAMPLF  METER READING/SCALE          22.8/2          9.1/2         20.4/2
    NOX  SAMPLE  PPM                            22.8            9.1           20.4
    NOX  BACKGRD METER READING/SCALE            .5/2           .5/2           .6/2
    NOX  BACKGRD PPM                              .5             .5             .6
    SO2  SAMPLE  METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLF  PPM                             0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                             0.0            0.0            0.0

    HC   CONCENTRATION PPM                       212            137            123
    CO   CONCENTRATION PPM                      1306           1161           1271
    CO2  CONCENTRATION PCT                       .39            .31            .36
    NOX  CONCENTRATION PPM                      22.3            8.6           19.8
    SO2  CONCENTRATION PPM                       0.0            0.0            0.0
    HC   MASS GRAMS                             3.24           3.59           1.88
    CO   MASS GRAMS                            40.19          61.29          39.15
    CO2  MASS GRAMS                           191.96         257.70         174.17
    NOX  MASS GRAMS                              .95            .63            .85
    SO2  MASS GRAMS                             0.00           0.00           0.00
    TOTAL CARBON GRAMS                         72.43          99.72          65.95

    WEIGHTED MASS HC        .55 GRAMS/KILOMETRE
    WEIGHTED MASS CO       4.17 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     39.96 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .14 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        11.00 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  42.0  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST                 238.10 GRAMS
    ESTIMATED FUEL WEIGHT =    .28KG.
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      TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                                 VEHICLE NUMBER 200

DATE  4/ 4/77                    TIME    -0 HRS.          TEST NO.  1
MODEL  1976 HONDA XL-125 FET 2ND STEP.1.33:2 AIR   ENGINE  .1 LITRE  1
DRIVER   KN                      TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  13 C              DRY BULB TEMP  24 C      REL. HUM.  26.2 PCT
SPEC. HUM.   5.1 GRAM/KG     BARO.  733.0 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.  228.6  MM. H2O
  BLOWER DIF.  PRESS.  254.0  MM  H2O
  BLOWER INLET TEMP.     43  DEG. C
  DYNO REVOLUTIONS      9933
  DISTANCE TRAVELED    16.51  KILOMETRES
  BLOWER REVOLUTIONS     5322
  BLOWER CU. CM /REV.  8531

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              28.1/3
   HC   SAMPLE  PPM                               281
   HC   BACKGRD METER READING/SCALE               1.5/3
   HC   BACKGRD PPM                                15
   CO   SAMPLE  METER READING/SCALE              61.4/2
   CO   SAMPLE  PPM                              3205
   CO   BACKGRD METER READING/SCALE                .1/2
   CO   BACKGRD PPM                                 4
   CO2  SAMPLE  METER READING/SCALE              63.3/3
   CO2  SAMPLE  PERCENT                          1.13
   CO2  BACKGRD METER READING/SCALE               4.4/3
   CO2  BACKGRD PERCENT                           .07
   NOX  SAMPLE  METER READING/SCALE              65.1/3
   NOX  SAMPLE  PPM                             195.3
   NOX  BACKGRD METER READING/SCALE                .4/3
   NOX  BACKGRD PPM                               1.2
   HC   CONCENTRATION PPM                         268
   CO   CONCENTRATION PPM                        3105
   CO2  CONCENTRATION PCT                        1.07
   NOX  CONCENTRATION PPM                       194.2
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                             6.12
   CO   MASS (GRAMS)                           143.31
   CO2  MASS (GRAMS)                           778.83
   NOX  MASS (GRAMS)                            12.44
   SO2  MASS (GRAMS)                             0.00

HC   GRAMS/KILOMETRE        .37
CO   GRAMS/KILOMETRE       8.68
CO2  GRAMS/KILOMETRE      47.17
NOX  GRAMS/KILOMETRE        .75
SO2  GRAMS/KILOMETRE       0.00

HC   GRAMS/KG OF FUEL   18.95      HC   GRAMS/MIN     .48
CO   GRAMS/KG OF FUEL   443.8      CO   GRAMS/MIN    11.2
CO2  GRAMS/KG OF FUEL    2412      CO2  GRAMS/MIN     61
NOX  GRAMS/KG OF FUEL   38.53      NOX  GRAMS/MIN     .98
SO2  GRAMS/KG OF FUEL    0.00      SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                        37.56  KILOMETRES/LITRE
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                              TABLE                      VEHICLE EMISSION RESULTS
UNIT NO.  200          TEST NO. 2               1975  LIGHT DUTY EMISSIONS TEST
VEHICLE MODEL  XL-125 2ND,1,33:2 AIR    DATE  4/ 7/77                     MFGR. CODE   -0
                                        ENGINE    .13 LITRE 1             CURB WT.      0 KG              YR.  1976
BAROMETER 751,84 MM OF HG.                                                                                GVW     0 KG
DRY BULB TEMP.   25.6 DEG. C                                     WET BULB TEMP  17.2 DEG. C
REL. HUMIDITY     43 PCT.                                        ABS. HUMIDITY   8.8 GRAMS/KG
                                                                 DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 266.7 MM. H2O                        BLOWER INLET PRESS., G1 291.3 MM. H2O
    BAG RESULTS                                                  BLOWER INLET TEMP.   43 DEG. C
    BAG NO.                                    1                2                3
    BLOWER REVOLUTIONS                      3516             6039             3521
    ROLL COUNTS                             2782             3766             2778
    HC   SAMPLE  METER READING/SCALE      26.0/3           16.2/3           15.6/3
    HC   SAMPLE  PPM                         260              162              156
    HC   BACKGRD METER READING/SCALE       2.8/3            2.9/3            2.1/3
    HC   BACKGRD PPM                          28               29               21
    CO   SAMPLE  METER READING/SCALE      64.6/3           52.8/3           62.8/3
    CO   SAMPLE  PPM                        1651             1308             1597
    CO   BACKGRD METER READING/SCALE        .1/3             .3/3             .4/3
    CO   BACKGRD PPM                           2                6                9
    CO2  SAMPLE  METER READING/SCALE      28.2/3           23.9/3           26.4/3
    CO2  SAMPLE  PERCENT                     .46              .39              .43
    CO2  BACKGRD METER READING/SCALE       4.3/3            4.2/3            4.8/3
    CO2  BACKGRD PERCENT                     .07              .06              .07
    NOX  SAMPLE  METER READING/SCALE      17.5/2            7.3/2           16.1/2
    NOX  SAMPLE  PPM                        17.5              7.3             16.1
    NOX  BACKGRD METER READING/SCALE        .7/2             .6/2             .5/2
    NOX  BACKGRD PPM                          .7               .6               .5
    SO2  SAMPLE  METER READING/SCALE     -0.0/*           -0.0/*           -0.0/*
    SO2  SAMPLE  PPM                         0.0              0.0              0.0
    SO2  BACKGRD METER READING/SCALE     -0.0/*           -0.0/*           -0.0/*
    SO2  BACKGRD PPM                         0.0              0.0              0.0

    HC   CONCENTRATION PPM                   233              134              136
    CO   CONCENTRATION PPM                  1612             1279             1553
    CO2  CONCENTRATION PCT                   .40              .33              .36
    NOX  CONCENTRATION PPM                  16.8              6.7             15.6
    SO2  CONCENTRATION PPM                   0.0              0.0              0.0
    HC   MASS GRAMS                         3.60             3.56             2.10
    CO   MASS GRAMS                        50.22            68.20            48.48
    CO2  MASS GRAMS                       197.29           276.08           178.20
    NOX  MASS GRAMS                          .81              .56              .75
    SO2  MASS GRAMS                         0.00             0.00             0.00
    TOTAL CARBON GRAMS                     78.50           107.67            71.24

    WEIGHTED MASS HC        .58 GRAMS/KILOMETRE
    WEIGHTED MASS CO      10.79 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     42.51 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .12 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        10.88 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  38.5  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              257.42 GRAMS
    ESTIMATED FUEL WEIGHT =   .30KG.
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     TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 200

DATE  4/ 7/77               TIME    -0 HRS.          TEST NO.  2
MODEL  1976 HONDA XL-125 FET 2ND STEP, 1.33:2 AIR   ENGINE  .1 LITRE  1
DRIVER   KN                 TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  16 C         DRY BULB TEMP  24 C      REL. HUM.  38.1 PCT
SPEC. HUM.   7.3 GRAM/KG    BARO.  751.3 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION           12.75 MINUTES
  BLOWER INLET PRESS.   241.3  MM. H20
  BLOWER DIF.  PRESS.   266.7  MM  H20
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS     10160
  DISTANCE TRAVELED    16.89  KILOMETRES
  BLOWER REVOLUTIONS      5321
  BLOWER CU. CM /REV.   8508

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE               31.5/3
   HC   SAMPLE  PPM                                315
   HC   BACKGRD METER READING/SCALE                1.7/3
   HC   BACKGRD PPM                                 17
   CO   SAMPLE  METER READING/SCALE               66.7/2
   CO   SAMPLE  PPM                               3616
   CO   BACKGRD METER READING/SCALE                 .1/2
   CO   BACKGRD PPM                                  4
   CO2  SAMPLE  METER READING/SCALE               64.9/3
   CO2  SAMPLE  PERCENT                           1.16
   CO2  BACKGRD METER READING/SCALE                3.7/3
   CO2  BACKGRD PERCENT                            .06
   NOX  SAMPLE  METER READING/SCALE               59.7/3
   NOX  SAMPLE  PPM                              179.1
   NOX  BACKGRD METER READING/SCALE                 .4/3
   NOX  BACKGRD PPM                                1.2
   HC   CONCENTRATION PPM                          300
   CO   CONCENTRATION PPM                         3487
   CO2  CONCENTRATION PCT                         1.11
   NOX  CONCENTRATION PPM                        178.0
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                              7.00
   CO   MASS (GRAMS)                            164.34
   CO2  MASS (GRAMS)                            826.71
   NOX  MASS (GRAMS)                             12.40
   SO2  MASS (GRAMS)                              0.00

 HC   GRAMS/KILOMETRE         .41
 CO   GRAMS/KILOMETRE        9.73
 CO2  GRAMS/KILOMETRE       48.95
 NOX  GRAMS/KILOMETRE         .73
 SO2  GRAMS/KILOMETRE        0.00

 HC   GRAMS/KG OF FUEL  20.04     HC   GRAMS/MIN     .55
 CO   GRAMS/KG OF FUEL  470.5     CO   GRAMS/MIN    12.9
 CO2  GRAMS/KG OF FUEL   2367     CO2  GRAMS/MIN      65
 NOX  GRAMS/KG OF FUEL  35.50     NOX  GRAMS/MIN     .97
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                       35.52  KILOMETRES/LITRE
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                                TABLE                       VEHICLE EMISSION RESULTS
                                                      1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  200          TEST NO. 1           DATE  4/ 8/77
VEHICLE MODEL  XL-125 1ST,REED -AIR         ENGINE     .13 LITRE )              MFGR. CODE   -0                          YR.  1976
                                                                                CURB WT.      0 KG                       GVM      0 KG
BAROMETER 747.52 MM OF HG.
DRY BULB TEMP.   26.1 DEG. C                                              WET BULB TEMP  17.8 DEG. C
REL. HUMIDITY      44 PCT.                                                ABS. HUMIDITY   9.3 GRAMS/KG
                                                                          DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 266.7 MM. H2O                                 BLOWER INLET PRESS., G1 241.3 MM. H2O
    BAG RESULTS                                                           BLOWER INLET TEMP.   43 DEG. C
    BAG NO.                                       1               2               3
    BLOWER REVOLUTIONS                         3567            6041            3520
    ROLL COUNTS                                 2766            3703            2770
    HC   SAMPLE  METER READING/SCALE           23.8/3          19.8/3          19.0/3
    HC   SAMPLE  PPM                            238             198             190
    HC   BACKGRD METER READING/SCALE           1.3/3           1.7/3           1.6/3
    HC   BACKGRD PPM                             13              17              16
    CO   SAMPLE  METER READING/SCALE           61.5/3          69.0/3          72.8/3
    CO   SAMPLE  PPM                           1558            1789            1913
    CO   BACKGRD METER READING/SCALE            .2/3            .5/3            .3/3
    CO   BACKGRD PPM                              4              11               6
    CO2  SAMPLE  METER READING/SCALE           25.1/3          19.7/3          23.0/3
    CO2  SAMPLE  PERCENT                        .41             .32             .37
    CO2  BACKGRD METER READING/SCALE           3.2/3           4.2/3           3.9/3
    CO2  BACKGRD PERCENT                        .05             .06             .06
    NOX  SAMPLE  METER READING/SCALE           18.8/2           6.9/2          14.3/2
    NOX  SAMPLE  PPM                           18.8             6.9            14.3
    NOX  BACKGRD METER READING/SCALE           1.0/2            .7/2            .5/2
    NOX  BACKGRD PPM                            1.0              .7              .5
    SO2  SAMPLE  METER READING/SCALE          -0.0/*          -0.0/*          -0.0/*
    SO2  SAMPLE  PPM                            0.0             0.0             0.0
    SO2  BACKGRD METER READING/SCALE          -0.0/*          -0.0/*          -0.0/*
    SO2  BACKGRD PPM                            0.0             0.0             0.0

    HC   CONCENTRATION PPM                      226             182             175
    CO   CONCENTRATION PPM                     1520            1742            1866
    CO2  CONCENTRATION PCT                      .36             .25             .32
    NOX  CONCENTRATION PPM                     17.8             6.2            13.8
    SO2  CONCENTRATION PPM                      0.0             0.0             0.0
    HC   MASS GRAMS                            3.51            4.79            2.68
    CO   MASS GRAMS                           47.74           92.69           57.85
    CO2  MASS GRAMS                          179.85          213.82          154.55
    NOX  MASS GRAMS                             .88             .52             .67
    SO2  MASS GRAMS                            0.00            0.00            0.00
    TOTAL CARBON GRAMS                        72.59          102.24           69.31

    WEIGHTED MASS HC        .73 GRAMS/KILOMETRE
    WEIGHTED MASS CO      13.59 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     35.26 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .12 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        10.76 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  40.1  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              244.15 GRAMS
    ESTIMATED FUEL WEIGHT =    .28KG.
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      TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                             VEHICLE NUMBER 200

DATE  4/ 8/77                 TIME    -0 HRS.           TEST NO.  1
MODEL  1976 HONDA XL-125 FET 1ST CHFV REED- AIR        ENGINE  .1 LITRE  1
DRIVER   KN                   TEST WT.     0 KG.        GVW    0 KG
WET BULB TEMP  17 C           DRY BULB TEMP  26 C       REL. HUM.  40.4 PCT
SPEC. HUM.   8.6 GRAM/KG      BARO.  748.5 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION            12.76 MINUTES
  BLOWER INLET PRESS.   241.3  MM. H20
  BLOWER DIF.  PRESS.   266.7  MM  H20
  BLOWER INLFT TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9950
  DISTANCE TRAVELED   16.54  KILOMETRES
  BLOWER REVOLUTIONS     5324
  BLOWER CU. CM /REV.  8504

  BAG RESULTS
   HC   SAMPLE  MFTER RFADING/SCALE                34.4/3
   HC   SAMPLE  PPM                                  344
   HC   BACKGRD METER RFADING/SCALE                 1.7/3
   HC   BACKGRD PPM                                   17
   CO   SAMPLE  METFR READING/SCALE                63.7/2
   CO   SAMPLE  PPM                                 3380
   CO   BACKGRD METER READING/SCALE                  .1/2
   CO   BACKGRD PPM                                    4
   CO2 SAMPLF  METER READING/SCALE                 63.3/3
   CO2 SAMPLE  PERCENT                              1.13
   CO2 BACKGRD METER READING/SCALE                  3.8/3
   CO2 BACKGRD PERCENT                               .06
   NOX SAMPLF  METFR READING/SCALE                 61.2/3
   NOX SAMPLE  PPM                                 183.6
   NOX BACKGRD METFR READING/SCALE                   .5/3
   NOX BACKGRD PPM                                   1.5
   HC  CONCENTRATION PPM                             329
   CO  CONCENTRATION PPM                            3260
   CO2 CONCENTRATION PCT                            1.08
   NOX CONCENTRATION PPM                           182.3
   SO2 COCENTRATION PPM                              0.0
   HC  MASS (GRAMS)                                 7.65
   CO  MASS (GRAMS)                               153.05
   CO2 MASS (GRAMS)                               798.67
   NOX MASS (GRAMS)                                13.16
   SO2 MASS (GRAMS)                                 0.00

HC  GRAMS/KILOMETRE        .96
CO  GRAMS/KILOMETRE       9.25
CO2 GRAMS/KILOMETRE      48.29
NOX GRAMS/KILOMETRE        .80
SO2 GRAMS/KILOMETRF       0.00

HC  GRAMS/KG OF FUEL  22.80     HC  GRAMS/MIN     .60
CO  GRAMS/KG OF FUEL  456.2     CO  GRAMS/MIN    12.0
CO2 GRAMS/KG OF FUFL   2380     CO2 GRAMS/MIN      63
NOX GRAMS/KG OF FUEL  39.21     NOX GRAMS/MIN    1.03
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                      36.21  KILOMETRES/LITRE
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                          TABLE                  VEHICLE EMISSION RESULTS
                                          1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  200          TEST NO. 2       DATE  4/19/77                       MFGR. CODE   -0                     YR.  1976
VEHICLE MUDFL  XL-125 1ST,REED-AIR      ENGINE     .13 LITRE 1              CURB WT.     0 KG                   GVM     0 KG

BAROMETER 735.58 MM OF HG.
DRY BULB TEMP.    25.6 DEG. C                                       WET BULB TEMP  20.6 DEG. C
REL. HUMIDITY      64 PCT.                                          ABS. HUMIDITY  13.5 GRAMS/KG
                                                                    DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

   BLOWER DIF. PRESS., G2, 254.0 MM. H2O                            BLOWER INLET PRESS., G1 203.2 MM. H2O
   BAG RESULTS                                                      BLOWER INLET TEMP.   43 DEG. C
   BAG NO.                                       1               2               3
   BLOWER REVOLUTIONS                         3520            6043            3521
   ROLL COUNTS                                2839            3761            2827
   HC    SAMPLE  METER READING/SCALE        24.7/3          21.6/3          21.3/3
   HC    SAMPLE  PPM                          247             216             213
   HC    BACKGRD METER READING/SCALE         1.6/3           1.8/3           1.8/3
   HC    BACKGRD PPM                           16              18              18
   CO    SAMPLE  METER READING/SCALE        71.2/2          64.6/3          77.8/3
   CO    SAMPLE  PPM                         3983            1808            2086
   CO    BACKGRD METER READING/SCALE          .1/3            .3/3            .1/3
   CO    BACKGRD PPM                            2               6               2
   CO2   SAMPLE  METER READING/SCALE        26.2/3          20.2/3          24.5/3
   CO2   SAMPLE  PERCENT                      .43             .33             .40
   CO2   BACKGRD METER READING/SCALE         3.9/3           3.5/3           3.8/3
   CO2   BACKGRD PERCENT                      .06             .05             .06
   NOX   SAMPLE  METER READING/SCALE        14.9/2           6.2/2          13.1/2
   NOX   SAMPLE  PPM                         14.9             6.2            13.1
   NOX   BACKGRD METER READING/SCALE          .5/2            .3/2            .3/2
   NOX   BACKGRD PPM                           .5              .3              .3
   SO2   SAMPLE  METER READING/SCALE        -0.0/*          -0.0/*          -0.0/*
   SO2   SAMPLE  PPM                          0.0             0.0             0.0
   SO2   BACKGRD METER READING/SCALE        -0.0/*          -0.0/*          -0.0/*
   SO2   BACKGRD PPM                          0.0             0.0             0.0

   HC    CONCENTRATION PPM                    232             199             196
   CO    CONCENTRATION PPM                   3866            1753            2025
   CO2   CONCENTRATION PCT                    .37             .27             .34
   NOX   CONCENTRATION PPM                   14.9             5.9            12.8
   SO2   CONCENTRATION PPM                    0.0             0.0             0.0
   HC    MASS GRAMS                          3.53            5.19            2.98
   CO    MASS GRAMS                        118.84           92.51           62.27
   CO2   MASS GRAMS                        180.74          227.90          166.71
   NOX   MASS GRAMS                           .80             .56             .71
   SO2   MASS GRAMS                          0.00            0.00            0.00
   TOTAL CARBON GRAMS                      103.36          106.37           74.78

   WEIGHTED MASS HC        .77 GRAMS/KILOMETRE
   WEIGHTED MASS CO      16.34 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     36.56 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .12 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE       10.96 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  36.6  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST               284.50 GRAMS
   ESTIMATED FUEL WEIGHT =   .33KG.
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     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 200

DATE  4/19/77             TIME       HRS.           TEST NO.  2
MODEL  1976 HONDA XL-125 FET 1ST CHEV REED-AIR     ENGINE  .1 LITRE  1
DRIVER   KN               TEST WT.        0 KG.     GVW    0 KG
WET BULB TEMP  19 C       DRY BULB TEMP  24 C      REL. HUM.  59.2 PCT
SPEC. HUM.  11.7 GRAM/KG  BARO.  735.1 MM  MG.    MEASURED FUEL  0.00 KG

  RUN DURATION          12.75 MINUTES
  BLOWER INLET PRESS.   241.3  MM. H2O
  BLOWER DIF.  PRESS.   266.7  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9960
  DISTANCE TRAVELED    16.56  KILOMETRES
  BLOWER REVOLUTIONS      5319
  BLOWER CU. CM /REV.   8486

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                40.5/3
   HC  SAMPLE  PPM                                 405
   HC  BACKGRD METER READING/SCALE                 1.8/3
   HC  BACKGRD PPM                                  18
   CO  SAMPLE  METER READING/SCALE               67.8/2
   CO  SAMPLE  PPM                                3704
   CO  BACKGRD METER READING/SCALE                  .2/2
   CO  BACKGRD PPM                                   8
   CO2 SAMPLE  METER READING/SCALE               63.6/3
   CO2 SAMPLE  PERCENT                           1.13
   CO2 BACKGRD METER READING/SCALE                 3.7/3
   CO2 BACKGRD PERCENT                             .06
   NOX SAMPLE  METER READING/SCALE               53.1/3
   NOX SAMPLE  PPM                              159.3
   NOX BACKGRD METER READING/SCALE                  .3/3
   NOX BACKGRD PPM                                  .9
   HC  CONCENTRATION PPM                           389
   CO  CONCENTRATION PPM                          3546
   CO2 CONCENTRATION PCT                          1.08
   NOX CONCENTRATION PPM                        158.5
   SO2 COCENTRATION PPM                           0.0
   HC  MASS (GRAMS)                               8.85
   CO  MASS (GRAMS)                             162.91
   CO2 MASS (GRAMS)                             787.00
   NOX MASS (GRAMS)                              12.37
   SO2 MASS (GRAMS)                               0.00

HC  GRAMS/KILOMETRE        .53
CO  GRAMS/KILOMETRE       9.84
CO2 GRAMS/KILOMETRE      47.54
NOX GRAMS/KILOMETRE        .75
SO2 GRAMS/KILOMETRE       0.00

HC  GRAMS/KG OF FUEL  26.20     HC  GRAMS/MIN    .69
CO  GRAMS/KG OF FUEL  482.1     CO  GRAMS/MIN   12.8
CO2 GRAMS/KG OF FUEL   2329     CO2 GRAMS/MIN     62
NOX GRAMS/KG OF FUEL  36.60     NOX GRAMS/MIN    .97
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                    35.99  KILOMETRES/LITRE
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                         TABLE                         VEHICLE EMISSION RESULTS
                                                 1975  LIGHT DUTY EMISSIONS TEST
UNIT NO. 200          TEST NO. 1          DATE  5/12/77                    MFGR. CODE   -0                          YR.  1976
VEHICLE MODEL  XL125 LEAN+AIR+CDI         ENGINE     .13 LITRE 1            CURB WT.      0 KG                       GVM      0 KG

BAROMETER 743.97 MM OF HG.
DRY BULB TEMP.    25.6 DEG. C                                   WET BULB TEMP  18.3 DEG. C
REL. HUMIDITY      50 PCT.                                      ABS. HUMIDITY  10.3 GRAMS/KG
                                                                DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 127.0 MM. H2O                        BLOWER INLET PRESS., G1 101.6 MM. H2O
    BAG RESULTS                                                  BLOWER INLET TEMP.   43 DEG. C
    BAG NO.                                   1                  2                  3
    BLOWER REVOLUTIONS                      3522               6092               3523
    ROLL COUNTS                             2844               3830               2847
    HC    SAMPLE  METER READING/SCALE      20.7/3             13.8/3             13.5/3
    HC    SAMPLE  PPM                       207                138                135
    HC    BACKGRD METER READING/SCALE       1.7/3              1.8/3              1.8/3
    HC    BACKGRD PPM                        17                 18                 18
    CO    SAMPLE  METER READING/SCALE      44.6/3             34.2/3             44.3/3
    CO    SAMPLE  PPM                      1085                813               1077
    CO    BACKGRD METER READING/SCALE        .1/3               .1/3               .1/3
    CO    BACKGRD PPM                          2                  2                  2
    CO2   SAMPLE  METER READING/SCALE      28.6/3             26.2/3             27.9/3
    CO2   SAMPLE  PERCENT                    .47                .43                .46
    CO2   BACKGRD METER READING/SCALE       3.5/3              3.7/3              3.9/3
    CO2   BACKGRD PERCENT                    .05                .06                .06
    NOX   SAMPLE  METER READING/SCALE      19.0/2             10.0/2             19.7/2
    NOX   SAMPLE  PPM                       19.0               10.0               19.7
    NOX   BACKGRD METER READING/SCALE        .6/2               .5/2               .6/2
    NOX   BACKGRD PPM                         .6                 .5                 .6
    SO2   SAMPLE  METER READING/SCALE      -0.0/*             -0.0/*             -0.0/*
    SO2   SAMPLE  PPM                        0.0                0.0                0.0
    SO2   BACKGRD METER READING/SCALE      -0.0/*             -0.0/*             -0.0/*
    SO2   BACKGRD PPM                        0.0                0.0                0.0

    HC    CONCENTRATION PPM                 191                121                118
    CO    CONCENTRATION PPM                1055                791               1048
    CO2   CONCENTRATION PCT                  .42                .37                .40
    NOX   CONCENTRATION PPM                 18.4                9.5               19.1
    SO2   CONCENTRATION PPM                  0.0                0.0                0.0
    HC    MASS GRAMS                        3.17               3.47               1.96
    CO    MASS GRAMS                       35.43              45.95              35.19
    CO2   MASS GRAMS                      222.44             343.01             212.75
    NOX   MASS GRAMS                        1.00                .90               1.04
    SO2   MASS GRAMS                        0.00               0.00               0.00
    TOTAL CARBON GRAMS                     78.65             116.32              74.85

    WEIGHTED MASS HC       .54 GRAMS/KILOMETRE
    WEIGHTED MASS CO      7.32 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    50.46 GRAMS/KILOMETRE
    WEIGHTED MASS NOX      .17 GRAMS/KILOMETRE
    WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        11.10 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  37.0  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST               269.82 GRAMS
    ESTIMATED FUEL WEIGHT =    .31KG.
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       TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 200

DATE  5/12/77                   TIME    -0 HRS.          TEST NO.  1
MODEL  1976 HONDA XL125 FET LEAN+AIR+CDI                 ENGINE  .1 LITRE  1
DRIVER   KN                     TEST WT.   793 KG.       GVW    0 KG
WET BULB TEMP  19 C             DRY BULB TEMP  26 C      REL. HUM.  53.7 PCT
SPEC. HUM.  11.7 GRAM/KG        BARO.  738.9 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION            12.76 MINUTES
  BLOWER INLET PRESS.   101.6  MM. H2O
  BLOWER DIF.  PRESS.   127.0  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS        9974
  DISTANCE TRAVELED    16.58  KILOMETRES
  BLOWER REVOLUTIONS      5326
  BLOWER CU. CM /REV.  9115

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                19.5/3
   HC   SAMPLE  PPM                                 195
   HC   BACKGRD METER READING/SCALE                 2.7/3
   HC   BACKGRD PPM                                  27
   CO   SAMPLE  METER READING/SCALE                83.0/3
   CO   SAMPLE  PPM                                2281
   CO   BACKGRD METER READING/SCALE                  .2/3
   CO   BACKGRD PPM                                    4
   CO2  SAMPLE  METER READING/SCALE                73.1/3
   CO2  SAMPLE  PERCENT                            1.33
   CO2  BACKGRD METER READING/SCALE                 2.9/3
   CO2  BACKGRD PERCENT                             .04
   NOX  SAMPLE  METER READING/SCALE                40.2/3
   NOX  SAMPLE  PPM                               120.6
   NOX  BACKGRD METER READING/SCALE                  .2/3
   NOX  BACKGRD PPM                                  .6
   HC   CONCENTRATION PPM                           171
   CO   CONCENTRATION PPM                          2180
   CO2  CONCENTRATION PCT                          1.29
   NOX  CONCENTRATION PPM                         120.1
   SO2  COCENTRATION PPM                           0.0
   HC   MASS (GRAMS)                               4.27
   CO   MASS (GRAMS)                             109.83
   CO2  MASS (GRAMS)                            1025.26
   NOX  MASS (GRAMS)                              10.26
   SO2  MASS (GRAMS)                               0.00

HC   GRAMS/KILOMETRE         .26
CO   GRAMS/KILOMETRE        6.62
CO2  GRAMS/KILOMETRE       61.84
NOX  GRAMS/KILOMETRE         .62
SO2  GRAMS/KILOMETRE        0.00

HC   GRAMS/KG OF FUEL  11.18     HC   GRAMS/MIN     .33
CO   GRAMS/KG OF FUEL  287.3     CO   GRAMS/MIN     8.6
CO2  GRAMS/KG OF FUEL   2682     CO2  GRAMS/MIN      80
NOX  GRAMS/KG OF FUEL  26.84     NOX  GRAMS/MIN     .80
SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                       31.87  KILOMETRES/LITRE
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              TABLE                      VEHICLE EMISSION RESULTS
                                    1978  LIGHT DUTY EMISSIONS TEST
UNIT NO.  200         TEST NO. 2       DATE  5/13/77                  MFGR. CODE   -0                  YR.  1976
VEHICLE MODEL  XL-185 LEAN+AIR+CDI     ENGINE     .13 LITRE 1         CURB WT.      0 KG               GVM      0 KG

BAROMETER 743.99 MM OF HG.                                           WET BULB TEMP  21.7 DEG. C
DRY BULB TEMP.   26.1 DEG. C                                         ABS. HUMIDITY  14.7 GRAMS/KG
REL. HUMIDITY      68 PCT.                                           DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS

     BLOWER DIF. PRESS., G2, 139.9 MM. H2O                           BLOWER INLET PRESS., G1 114.3 MM. H2O
     BAG RESULTS                                                     BLOWER INLET TEMP.   43 DEG. C
     BAG NO.                                  1                2                3
     BLOWER REVOLUTIONS                    3568             6033             3530
     ROLL COUNTS                            2840             3809             2848
     HC   SAMPLE  METER READING/SCALE      19.1/3           13.7/3           13.7/3
     HC   SAMPLE  PPM                       191              137              137
     HC   BACKGRD METER READING/SCALE       2.3/3            2.3/3            2.3/3
     HC   BACKGRD PPM                        23               23               23
     CO   SAMPLE  METER READING/SCALE      41.7/3           33.4/3           43.3/3
     CO   SAMPLE  PPM                      1008              793             1050
     CO   BACKGRD METER READING/SCALE       .1/3             .2/3             .1/3
     CO   BACKGRD PPM                         2                4                2
     CO2  SAMPLE  METER READING/SCALE      27.3/3           24.7/3           26.8/3
     CO2  SAMPLE  PERCENT                   .45              .40              .44
     CO2  BACKGRD METER READING/SCALE       2.9/3            3.2/3            3.3/3
     CO2  BACKGRD PERCENT                   .04              .05              .05
     NOX  SAMPLE  METER READING/SCALE      13.7/2            7.6/2           13.1/2
     NOX  SAMPLE  PPM                      13.7              7.6             13.1
     NOX  BACKGRD METER READING/SCALE       .9/2             .8/2             .6/2
     NOX  BACKGRD PPM                        .9               .8               .6
     SO2  SAMPLE  METER READING/SCALE     -0.0/*           -0.0/*           -0.0/*
     SO2  SAMPLE  PPM                       0.0              0.0              0.0
     SO2  BACKGRD METER READING/SCALE     -0.0/*           -0.0/*           -0.0/*
     SO2  BACKGRD PPM                       0.0              0.0              0.0

     HC   CONCENTRATION PPM                 169              115              115
     CO   CONCENTRATION PPM                 975              765             1016
     CO2  CONCENTRATION PCT                 .41              .36              .39
     NOX  CONCENTRATION PPM                12.8              6.8             12.5
     SO2  CONCENTRATION PPM                 0.0              0.0              0.0
     HC   MASS GRAMS                       2.82             3.24             1.90
     CO   MASS GRAMS                      32.87            43.62            33.90
     CO2  MASS GRAMS                     215.84           319.81           205.78
     NOX  MASS GRAMS                        .82              .74              .79
     SO2  MASS GRAMS                       0.00             0.00             0.00
     TOTAL CARBON GRAMS                   75.45           108.79            72.34

     WEIGHTED MASS HC         .50 GRAMS/KILOMETRE
     WEIGHTED MASS CO        6.97 GRAMS/KILOMETRE
     WEIGHTED MASS CO2      47.91 GRAMS/KILOMETRE
     WEIGHTED MASS NOX        .14 GRAMS/KILOMETRE
     WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE          11.06 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  38.9  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST                256.58 GRAMS
     ESTIMATED FUEL WEIGHT =    .30KG.
     TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                             VEHICLE NUMBER 200

DATE  5/13/77                   TIME     -0 HRS.           TEST NO.  2
MODEL  1976 HONDA XL125 FET LEAN+AIR+CDI                   ENGINE  .1 LITRE  1
DRIVER   KN                     TEST WT.       0 KG.       GVW    0 KG
WET BULB TEMP  22 C             DRY BULB TEMP  26 C        REL. HUM.  67.8 PCT
SPEC. HUM.  14.8 GRAM/KG        BARO.  740.7 MM  HG.       MEASURED FUEL  0.00 KG

  RUN DURATION            12.75 MINUTES
  BLOWER INLET PRESS.   114.3  MM. H2O
  BLOWER DIF.  PRESS.   139.7  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS       9924
  DISTANCE TRAVELED    16.50  KILOMETRES
  BLOWER REVOLUTIONS      5322
  BLOWER CU. CM /REV.   9050

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              16.3/3
   HC   SAMPLE  PPM                               163
   HC   BACKGRD METER READING/SCALE               2.2/3
   HC   BACKGRD PPM                                22
   CO   SAMPLE  METER READING/SCALE              71.2/3
   CO   SAMPLE  PPM                              1860
   CO   BACKGRD METER READING/SCALE                .1/3
   CO   BACKGRD PPM                                 2
   CO2  SAMPLE  METER READING/SCALE              67.9/3
   CO2  SAMPLE  PERCENT                          1.22
   CO2  BACKGRD METER READING/SCALE               3.7/3
   CO2  BACKGRD PERCENT                           .06
   NOX  SAMPLE  METER READING/SCALE              32.6/3
   NOX  SAMPLE  PPM                              97.8
   NOX  BACKGRD METER READING/SCALE                .4/3
   NOX  BACKGRD PPM                              1.2
   HC   CONCENTRATION PPM                        143
   CO   CONCENTRATION PPM                       1774
   CO2  CONCENTRATION PCT                       1.17
   NOX  CONCENTRATION PPM                       96.7
   SO2  COCENTRATION PPM                        0.0
   HC   MASS (GRAMS)                            3.55
   CO   MASS (GRAMS)                           88.77
   CO2  MASS (GRAMS)                          925.42
   NOX  MASS (GRAMS)                            9.17
   SO2  MASS (GRAMS)                            0.00

 HC   GRAMS/KILOMETRE        .22
 CO   GRAMS/KILOMETRE       5.38
 CO2  GRAMS/KILOMETRE      56.10
 NOX  GRAMS/KILOMETRE        .56
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  10.46     HC   GRAMS/MIN      .28
 CO   GRAMS/KG OF FUEL  261.4     CO   GRAMS/MIN     7.0
 CO2  GRAMS/KG OF FUEL   2725     CO2  GRAMS/MIN      73
 NOX  GRAMS/KG OF FUEL  27.02     NOX  GRAMS/MIN      .72
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY
                                               35.69  KILOMETRES/LITRE
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                  TABLE                          VEHICLE EMISSION RESULTS
                                             1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  200         TEST NO. 1         DATE  8/ 4/77
VEHICLE MODEL   XL125 LN+CAT+AIR          ENGINE     .13 LITRE 1           MFGR. CODE    -0                     YR.   1976
                                                                           CURB WT.       0 KG                  GVW       0 KG

BAROMETER 740.66 MM OF HG.
DRY BULB TEMP.    28.3 DEG. C                                              WET BULB TEMP  22.2 DEG. C
REL. HUMIDITY       59 PCT.                                                ABS. HUMIDITY  14.6 GRAMS/KG
                                                                           DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

     BLOWER DIF. PRESS., G2, 254.0 MM. H2O                                 BLOWER INLET PRESS., G1 228.6 MM. H2O
     BAG RESULTS                                                           BLOWER INLET TEMP.    43 DEG. C
     BAG NO.                                        1               2               3
     BLOWER REVOLUTIONS                          3541            6047            3571
     ROLL COUNTS                                  2774            3747            2884
     HC    SAMPLE  METER READING/SCALE           13.1/3          20.4/2          29.2/2
     HC    SAMPLE  PPM                            131              20              29
     HC    BACKGRD METER READING/SCALE            1.3/3           1.4/3          12.1/2
     HC    BACKGRD PPM                             13              14              12
     CO    SAMPLE  METER READING/SCALE           64.3/*          77.8/*          81.2/*
     CO    SAMPLE  PPM                            144              80              84
     CO    BACKGRD METER READING/SCALE             .9/*            .6/*           1.0/*
     CO    BACKGRD PPM                              2               1               1
     CO2   SAMPLE  METER READING/SCALE           30.4/3          27.7/3          31.3/3
     CO2   SAMPLE  PERCENT                         .51             .45             .52
     CO2   BACKGRD METER READING/SCALE            3.5/3           2.8/3           3.1/3
     CO2   BACKGRD PERCENT                         .05             .04             .05
     NOX   SAMPLE  METER READING/SCALE           23.1/2           8.3/2          19.3/2
     NOX   SAMPLE  PPM                           23.1             8.3            19.3
     NOX   BACKGRD METER READING/SCALE            1.1/2            .8/2            .8/2
     NOX   BACKGRD PPM                            1.1              .8              .8
     SO2   SAMPLE  METER READING/SCALE           -0.0/*          -0.0/*          -0.0/*
     SO2   SAMPLE  PPM                            0.0             0.0             0.0
     SO2   BACKGRD METER READING/SCALE           -0.0/*          -0.0/*          -0.0/*
     SO2   BACKGRD PPM                            0.0             0.0             0.0

     HC    CONCENTRATION PPM                      119               7              18
     CO    CONCENTRATION PPM                      139              77              81
     CO2   CONCENTRATION PCT                      .46             .41             .47
     NOX   CONCENTRATION PPM                     22.0             7.5            18.5
     SO2   CONCENTRATION PPM                      0.0             0.0             0.0
     HC    MASS GRAMS                            1.02             .18             .27
     CO    MASS GRAMS                            4.31            4.10            2.53
     CO2   MASS GRAMS                          225.87          346.60          234.24
     NOX   MASS GRAMS                            1.29             .75            1.09
     SO2   MASS GRAMS                            0.00            0.00            0.00
     TOTAL CARBON GRAMS                         65.07           96.51           65.25

     WEIGHTED MASS HC         .10 GRAMS/KILOMETRE
     WEIGHTED MASS CO         .68 GRAMS/KILOMETRE
     WEIGHTED MASS CO2      52.75 GRAMS/KILOMETRE
     WEIGHTED MASS NOX        .18 GRAMS/KILOMETRE
     WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE        10.95 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  43.3  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST             226.83 GRAMS
     ESTIMATED FUEL WEIGHT =   .26KG.
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      TABLE       EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 200

DATE  8/ 4/77                  TIME    -0 HRS.          TEST NO.  1
MODEL  1976 HONDA XL-125 FET LN+CAT+AIR                 ENGINE  .1 LITRE  1
DRIVER   KN                    TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  22 C            DRY BULB TEMP  30 C      REL. HUM.  50.9 PCT
SPEC. HUM.  13.9 GRAM/KG       BARO.  739.9 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION           12.72 MINUTES
  BLOWER INLET PRESS.   228.6  MM. H2O
  BLOWER DIF.  PRESS.   254.0  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS       9880
  DISTANCE TRAVELED     16.42  KILOMETRES
  BLOWER REVOLUTIONS      5310
  BLOWER CU. CM /REV.   8541

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              32.5/2
   HC   SAMPLE  PPM                                33
   HC   BACKGRD METER READING/SCALE              11.8/2
   HC   BACKGRD PPM                                12
   CO   SAMPLE  METER READING/SCALE              25.1/3
   CO   SAMPLE  PPM                               584
   CO   BACKGRD METER READING/SCALE                .1/3
   CO   BACKGRD PPM                                 2
   CO2  SAMPLE  METER READING/SCALE              80.5/3
   CO2  SAMPLE  PERCENT                          1.48
   CO2  BACKGRD METER READING/SCALE               3.9/3
   CO2  BACKGRD PERCENT                           .06
   NOX  SAMPLE  METER READING/SCALE              48.8/3
   NOX  SAMPLE  PPM                             146.4
   NOX  BACKGRD METER READING/SCALE                .5/3
   NOX  BACKGRD PPM                               1.5
   HC   CONCENTRATION PPM                         22
   CO   CONCENTRATION PPM                        556
   CO2  CONCENTRATION PCT                        1.43
   NOX  CONCENTRATION PPM                       145.1
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                              .51
   CO   MASS (GRAMS)                            25.88
   CO2  MASS (GRAMS)                          1048.95
   NOX  MASS (GRAMS)                            12.39
   SO2  MASS (GRAMS)                             0.00

HC   GRAMS/KILOMETRE        .03
CO   GRAMS/KILOMETRE       1.58
CO2  GRAMS/KILOMETRE      63.87
NOX  GRAMS/KILOMETRE        .75
SO2  GRAMS/KILOMETRE       0.00

HC   GRAMS/KG OF FUEL   1.48      HC   GRAMS/MIN     .04
CO   GRAMS/KG OF FUEL   75.2      CO   GRAMS/MIN    2.0
CO2  GRAMS/KG OF FUEL   3047      CO2  GRAMS/MIN     82
NOX  GRAMS/KG OF FUEL  35.99      NOX  GRAMS/MIN     .97
SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                       35.04  KILOMETRES/LITRE
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                TABLE                              VEHICLE EMISSION RESULTS
                                           1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  200         TEST NO. 2        DATE  8/ 5/77                      MFGR. CODE   -0               YR.  1976
VEHICLE MODEL  XL125 LN+CAT+AIR         ENGINE     .13 LITRE 1             CURB WT.      0 KG            GVM      0 KG

BAROMETER 741.93 MM OF HG.                                                 WET BULB TEMP  21.7 DEG. C
DRY BULB TEMP.   27.8 DEG. C                                               ABS. HUMIDITY  14.0 GRAMS/KG
REL. HUMIDITY     58 PCT.                                                  DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 139.7 MM. H2O                                  BLOWER INLET PRESS., G1 114.3 MM. H2O
    BAG RESULTS                                                            BLOWER INLET TEMP.   43 DEG. C
    BAG NO.                                      1              2              3
    BLOWER REVOLUTIONS                        3513           6048           3514
    ROLL COUNTS                               2827           3778           2828
    HC   SAMPLE  METER READING/SCALE          9.3/3         22.7/2         28.8/2
    HC   SAMPLE  PPM                            93             23             29
    HC   BACKGRD METER READING/SCALE          1.2/3          1.3/3         11.8/2
    HC   BACKGRD PPM                            12             13             12
    CO   SAMPLE  METER READING/SCALE         75.1/*         51.3/*         64.7/*
    CO   SAMPLE  PPM                           171            113            145
    CO   BACKGRD METER READING/SCALE           .7/*           .7/*           .6/*
    CO   BACKGRD PPM                             1              1              1
    CO2  SAMPLE  METER READING/SCALE         36.1/3         29.9/3         34.3/3
    CO2  SAMPLE  PERCENT                       .61            .49            .57
    CO2  BACKGRD METER READING/SCALE          3.9/3          3.7/3          3.8/3
    CO2  BACKGRD PERCENT                       .06            .06            .06
    NOX  SAMPLE  METER READING/SCALE         20.8/2          8.2/2         15.3/2
    NOX  SAMPLE  PPM                          20.8            8.2           15.3
    NOX  BACKGRD METER READING/SCALE          1.2/2           .9/2           .8/2
    NOX  BACKGRD PPM                           1.2             .9             .8
    SO2  SAMPLE  METER READING/SCALE         -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                           0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE         -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                           0.0            0.0            0.0

    HC   CONCENTRATION PPM                      82             10             18
    CO   CONCENTRATION PPM                     165            109            140
    CO2  CONCENTRATION PCT                     .55            .44            .52
    NOX  CONCENTRATION PPM                    19.7            7.3           14.5
    SO2  CONCENTRATION PPM                     0.0            0.0            0.0
    HC   MASS GRAMS                           1.34            .29            .29
    CO   MASS GRAMS                           5.46           6.21           4.63
    CO2  MASS GRAMS                         286.87         395.33         270.47
    NOX  MASS GRAMS                           1.20            .77            .99
    SO2  MASS GRAMS                           0.00           0.00           0.00
    TOTAL CARBON GRAMS                       81.79         110.81          76.05

    WEIGHTED MASS HC       .09 GRAMS/KILOMETRE
    WEIGHTED MASS CO      1.02 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    61.28 GRAMS/KILOMETRE
    WEIGHTED MASS NOX      .16 GRAMS/KILOMETRE
    WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       10.98 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  37.1  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              268.65 GRAMS
    ESTIMATED FUEL WEIGHT =   .31KG.
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     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 200

DATE  8/ 5/77                 TIME     -0 HRS.          TEST NO.  2
MODEL  1976 HONDA XL-125 FET LN+CAT+AIR                 ENGINE  .1 LITRE  1
DRIVER   KN                   TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  23 C           DRY BULB TEMP  29 C       REL. HUM.  56.6 PCT
SPEC. HUM.  14.9 GRAM/KG      BARO.  741.9 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.  114.3  MM. H20
  BLOWER DIF.  PRESS.  139.7  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9559
  DISTANCE TRAVELED   15.89  KILOMETRES
  BLOWER REVOLUTIONS     5321
  BLOWER CU. CM /REV.  9050

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              32.4/2
   HC   SAMPLE  PPM                                32
   HC   BACKGRD METER READING/SCALE              11.4/2
   HC   BACKGRD PPM                                11
   CO   SAMPLE  METER READING/SCALE              70.1/*
   CO   SAMPLE  PPM                               299
   CO   BACKGRD METER READING/SCALE                .4/*
   CO   BACKGRD PPM                                 1
   CO2  SAMPLE  METER READING/SCALE              74.5/3
   CO2  SAMPLE  PERCENT                          1.36
   CO2  BACKGRD METER READING/SCALE               3.6/3
   CO2  BACKGRD PERCENT                           .06
   NOX  SAMPLE  METER READING/SCALE              48.2/3
   NOX  SAMPLE  PPM                             144.6
   NOX  BACKGRD METER READING/SCALE                .4/3
   NOX  BACKGRD PPM                               1.2
   HC   CONCENTRATION PPM                          22
   CO   CONCENTRATION PPM                         285
   CO2  CONCENTRATION PCT                        1.31
   NOX  CONCENTRATION PPM                       143.5
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                              .55
   CO   MASS (GRAMS)                            14.28
   CO2  MASS (GRAMS)                          1034.47
   NOX  MASS (GRAMS)                            13.73
   SO2  MASS (GRAMS)                             0.00

HC   GRAMS/KILOMETRE        .03
CO   GRAMS/KILOMETRE        .90
CO2  GRAMS/KILOMETRE      65.10
NOX  GRAMS/KILOMETRE        .86
SO2  GRAMS/KILOMETRE       0.00

HC   GRAMS/KG OF FUEL    1.65     HC   GRAMS/MIN     .04
CO   GRAMS/KG OF FUEL    42.7     CO   GRAMS/MIN     1.1
CO2  GRAMS/KG OF FUEL    3097     CO2  GRAMS/MIN      81
NOX  GRAMS/KG OF FUEL   41.10     NOX  GRAMS/MIN    1.08
SO2  GRAMS/KG OF FUEL    0.00     SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                      34.95  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki, RE-5

Date 4/06/77 Sequence RES-1 Baseline

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1500	----	3.67	5.82	10.0	16.	20,800	
20	2	2600	0.51	2.56	8.30	7.8	45.	9,600	
30	3	3050	1.15	3.04	8.39	7.0	55.	8,030	primary ports
40	4	3350	2.11	1.88	9.68	6.5	135.	6,640	
50	5	3400	3.37	0.93	10.73	5.8	395.	5,760	
60	5	4000	4.86	0.56	11.49	4.5	920.	3,780	secondary ports
Idle	N	1500	----	3.67	6.25	9.0	18.	20,900	

Notes: conducted with new spark plug installed
max. temperature measured beneath the spark plug 105°C
max. exhaust gas temperature at 50 mph = 760°C at station # 1
max. exhaust gas temperature at 60 mph = 825°C at station # 1

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki RE-5

Date 6/6/77 Sequence RES-2

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1550	----	2.02	7.00	9.3	2.7	9,920	
20	2	2600	0.53	2.05	8.69	7.3	13.	6,040	
30	3	3050	1.16	2.05	9.62	6.0	26.	4,760	
40	4	3300	2.08	1.85	10.33	5.5	45.	4,120	dilution by exhaust
50	5	3400	3.30	1.21	11.50	4.2	75.	2,360	air cooling induction
60	5	4000	4.75	0.91	12.32	3.4	125.	1,460	system
Idle	N	1550	----	2.16	7.02	9.1	2.7	9,090	

Notes: RES-2 conducted with catalyst PTX No. 313 - all NGK; no air injected
Air induction into exhaust - operational

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki RE-5

Date 6/7/77 Sequence RES-3

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1550	----	3.39	9.18	4.7	5.	15,200
20	2	2700	0.52	3.34	11.44	2.4	23.	7,680
30	3	3000	1.13	2.79	10.95	3.3	12.	4,920
40	4	3250	2.09	2.28	11.44	3.1	26.	3,760
50	5	3300	3.26	1.12	12.62	2.7	82.	1,380
60	5	4000	4.68	0.62	13.10	2.3	170.	960
Idle	N	1550	----	3.45	9.05	5.5	5.	12,600

Notes: RES-3 conducted with catalyst PTX No. 313, 0 air injection, 0 air induction

Max. head temp. 100°C

Max. exhaust gas temp. 810°C at 60 mph

Max. catalyst exit temp. 730°C at 60 mph

W.O.T. accel time 0 - 100 kph = 6.65 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki RE-5

Date 6/16/77 Sequence RES-4

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Air Injection Rates by Pump No. 0440 at 1:2, cfm
Idle	N	1500	----	1.27	9.70	6.6	11.	1,440	1.45
20	2	2550	0.52	0.62	11.40	5.3	23.	488	2.62
30	3	3000	1.20	0.19	12.02	4.4	38.	430	3.07
40	4	3300	2.10	0.14	12.38	4.1	92.	560	3.40
50	5	3400	3.37	0.04	11.67	5.7	395.	450	3.46
60	5	3950	4.78	0.11	12.50	4.0	625.	616	3.98
Idle	N	1500	----	1.00	10.37	6.3	11.	760	1.45

Notes: Catalyst + air, Pump No. 0440, 1:2 pump:crankshaft

Max. head temp. 105°C Note: induction air blocked off

Max. exhaust gas temp. 800°C at 60 mph

Max. catalyst exit temp. 650°C at 60, 40, 30, 20 mph; 560°C at 50 mph

W.O.T. accel time 0 - 100 kph = 7.13 sec

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            TABLE                        VEHICLE EMISSION RESULTS
                                   1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  010        TEST NO. 1        DATE 10/19/76                      MFGR. CODE   -0                YR.  1976
VEHICLE MODEL  SUZUKI RE-5             ENGINE    .51 LITRE 1              CURB WT.      0 KG             GVW      0 KG

BAROMETER 741.68 MM OF HG.                                              WET BULB TEMP  19.4 DEG. C
DRY BULB TEMP.   26.1 DEG. C                                            ABS. HUMIDITY  11.6 GRAMS/KG
REL. HUMIDITY     54 PCT.                                               DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                        BLOWER INLET PRESS., G1 *31.6 MM. H2O
     BLOWER DIF. PRESS., G2, *78.0 MM. H2O                              BLOWER INLET TEMP.   43 DEG. C
     BAG RESULTS
     BAG NO.                                       1                2                3
     BLOWER REVOLUTIONS                        10358            17827            10361
     ROLL COUNTS                                3491             3726             3475
     HC   SAMPLE  METER READING/SCALE         11.3/4            7.7/4            7.7/4
     HC   SAMPLE  PPM                         1130              770              770
     HC   BACKGRD METER READING/SCALE          2.6/3            3.0/3            2.9/3
     HC   BACKGRD PPM                           26               30               29
     CO   SAMPLE  METER READING/SCALE         77.6/3           52.7/3           50.2/3
     CO   SAMPLE  PPM                         2079             1305             1236
     CO   BACKGRD METER READING/SCALE           .7/3             .2/3             .1/3
     CO   BACKGRD PPM                           15                4                2
     CO2  SAMPLE  METER READING/SCALE         43.5/3           33.0/3           42.6/3
     CO2  SAMPLE  PERCENT                      .74              .55              .73
     CO2  BACKGRD METER READING/SCALE          4.0/3            3.9/3            4.4/3
     CO2  BACKGRD PERCENT                      .06              .06              .07
     NOX  SAMPLE  METER READING/SCALE         14.1/2            4.7/2           15.9/2
     NOX  SAMPLE  PPM                         14.1              4.7             15.9
     NOX  BACKGRD METER READING/SCALE           .4/2             .5/2             .4/2
     NOX  BACKGRD PPM                           .4               .5               .4
     SO2  SAMPLE  METER READING/SCALE        -0.0/*           -0.0/*           -0.0/*
     SO2  SAMPLE  PPM                          0.0              0.0              0.0
     SO2  BACKGRD METER READING/SCALE        -0.0/*           -0.0/*           -0.0/*
     SO2  BACKGRD PPM                          0.0              0.0              0.0

     HC   CONCENTRATION PPM                   1106              742              743
     CO   CONCENTRATION PPM                   2000             1265             1195
     CO2  CONCENTRATION PCT                    .69              .49              .66
     NOX  CONCENTRATION PPM                   13.7              4.2             15.5
     SO2  CONCENTRATION PPM                    0.0              0.0              0.0
     HC   MASS GRAMS                         38.79            44.77            26.05
     CO   MASS GRAMS                        191.60           154.15            84.64
     CO2  MASS GRAMS                        767.95           948.87           741.68
     NOX  MASS GRAMS                          1.65              .87             1.86
     SO2  MASS GRAMS                          0.00             0.00             0.00
     TOTAL CARBON GRAMS                     303.89           363.82           261.27

     WEIGHTED MASS HC       6.37 GRAMS/KILOMETRE
     WEIGHTED MASS CO      21.97 GRAMS/KILOMETRE
     WEIGHTED MASS CO2    142.04 GRAMS/KILOMETRE
     WEIGHTED MASS NOX      .22 GRAMS/KILOMETRE
     WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       11.98 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  12.0  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST             928.97 GRAMS
     ESTIMATED FUEL WEIGHT =  1.07KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMBER 010

DATE 10/14/76              TIME     -0 HRS.          TEST NO.  1
MODEL  1976 SUZUKI RE-5    HIWAY CYCLE               ENGINE 0.0 LITRE  *
DRIVER   TJ                TEST WT.       0 KG.      GVW    0 KG
WET BULB TEMP  19 C        DRY BULB TEMP  27 C       REL. HUM.  47.6 PCT
SPEC. HUM.  10.6 GRAM/KG   BARO.  741.7 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS. 1524.1  MM. H2O
  BLOWER DIF.  PRESS. 1778.0  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9917
  DISTANCE TRAVELED   16.48  KILOMETRES
  BLOWER REVOLUTIONS    15694
  BLOWER CU. CM /REV.  7657

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              65.3/3
   HC   SAMPLE  PPM                               653
   HC   BACKGRD METER READING/SCALE               1.7/3
   HC   BACKGRD PPM                                17
   CO   SAMPLE  METER READING/SCALE              44.9/3
   CO   SAMPLE  PPM                              1093
   CO   BACKGRD METER READING/SCALE                .2/3
   CO   BACKGRD PPM                                 4
   CO2  SAMPLE  METER READING/SCALE              61.4/3
   CO2  SAMPLE  PERCENT                          1.09
   CO2  BACKGRD METER READING/SCALE               2.9/3
   CO2  BACKGRD PERCENT                           .04
   NOX  SAMPLE  METER READING/SCALE              34.6/2
   NOX  SAMPLE  PPM                              34.6
   NOX  BACKGRD METER READING/SCALE                .7/2
   NOX  BACKGRD PPM                                .7
   HC   CONCENTRATION PPM                         638
   CO   CONCENTRATION PPM                        1049
   CO2  CONCENTRATION PCT                        1.05
   NOX  CONCENTRATION PPM                        34.0
   SO2  COCENTRATION PPM                         0.0
   HC   MASS (GRAMS)                            33.86
   CO   MASS (GRAMS)                           112.49
   CO2  MASS (GRAMS)                          1779.25
   NOX  MASS (GRAMS)                             5.96
   SO2  MASS (GRAMS)                             0.00

HC   GRAMS/KILOMETRE      2.05
CO   GRAMS/KILOMETRE      6.82
CO2  GRAMS/KILOMETRE    107.94
NOX  GRAMS/KILOMETRE       .36
SO2  GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL  52.02      HC   GRAMS/MIN    2.65
CO   GRAMS/KG OF FUEL  172.8      CO   GRAMS/MIN     8.8
CO2  GRAMS/KG OF FUEL   2733      CO2  GRAMS/MIN     139
NOX  GRAMS/KG OF FUEL   9.16      NOX  GRAMS/MIN     .47
SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                     18.60  KILOMETRES/LITRE
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                        TABLE                       VEHICLE EMISSION RESULTS
                                                 1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  010        TEST NO. 2             DATE 10/15/76                    MFGR. CODE    -0                    YR.  1976
VEHICLE MODEL  SUZUKI RE-5                  ENGINE     .99 LITRE 1           CURB WT.      0 KG                  GVM      0 KG

BAROMETER 739.39 MM OF HG.                                              WET BULB TEMP  20.6 DEG. C
DRY BULB TEMP.    26.1 DEG. C                                           ABS. HUMIDITY  13.2 GRAMS/KG
REL. HUMIDITY      61 PCT.                                              DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                        BLOWER INLET PRESS., G1 *31.6 MM. H2O
     BLOWER DIF. PRESS., G2, *78.0 MM. H2O                              BLOWER INLET TEMP.   43 DEG. C
     BAG RESULTS
     BAG NO.                                      1              2              3
     BLOWER REVOLUTIONS                       10432          17830          10377
     ROLL COUNTS                               3507           3759           3511
     HC   SAMPLE  METER READING/SCALE        10.4/4         78.5/3         75.1/3
     HC   SAMPLE  PPM                          1040            785            751
     HC   BACKGRD METER READING/SCALE         1.5/3          1.9/3          2.2/3
     HC   BACKGRD PPM                            15             19             22
     CO   SAMPLE  METER READING/SCALE        75.2/3         59.1/3         52.2/3
     CO   SAMPLE  PPM                          1995           1987           1291
     CO   BACKGRD METER READING/SCALE          .5/3           .3/3           .1/3
     CO   BACKGRD PPM                            11              6              2
     CO2  SAMPLE  METER READING/SCALE        43.8/3         29.9/3         38.7/3
     CO2  SAMPLE  PERCENT                       .75            .49            .65
     CO2  BACKGRD METER READING/SCALE         2.9/3          2.0/3          2.6/3
     CO2  BACKGRD PERCENT                       .04            .03            .04
     NOX  SAMPLE  METER READING/SCALE        12.8/2          3.7/2         12.6/2
     NOX  SAMPLE  PPM                          12.8            3.7           12.6
     NOX  BACKGRD METER READING/SCALE          .6/2           .4/2           .4/2
     NOX  BACKGRD PPM                            .6             .4             .4
     SO2  SAMPLE  METER READING/SCALE       -0.0/*         -0.0/*         -0.0/*
     SO2  SAMPLE  PPM                           0.0            0.0            0.0
     SO2  BACKGRD METER READING/SCALE       -0.0/*         -0.0/*         -0.0/*
     SO2  BACKGRD PPM                           0.0            0.0            0.0

     HC   CONCENTRATION PPM                    1026            767            730
     CO   CONCENTRATION PPM                    1917           1938           1248
     CO2  CONCENTRATION PCT                     .71            .46            .62
     NOX  CONCENTRATION PPM                    12.2            3.3           12.2
     SO2  CONCENTRATION PPM                     0.0            0.0            0.0
     HC   MASS GRAMS                          36.11          46.13          25.56
     CO   MASS GRAMS                         136.22         174.63          88.16
     CO2  MASS GRAMS                         794.46         891.75         687.77
     NOX  MASS GRAMS                           1.56            .72           1.54
     SO2  MASS GRAMS                           0.00           0.00           0.00
     TOTAL CARBON GRAMS                      306.50         358.19         247.63

     WEIGHTED MASS HC       6.31 GRAMS/KILOMETRE
     WEIGHTED MASS CO      23.46 GRAMS/KILOMETRE
     WEIGHTED MASS CO2    134.53 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .19 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       12.08 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  12.3  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST            912.32 GRAMS
     ESTIMATED FUEL WEIGHT =  1.05KG.
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    TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 010

                               TIME     -0 HRS.         TEST NO.  2
DATE 10/15/76                  HIWAY CYCLE              ENGINE  .5 LITRE  1
MODEL  1976 SUZUKI RES         TEST WT.      0 KG.      GVW    0 KG
DRIVER   TJ                    DRY BULB TEMP  26 C      REL. HUM.  75.1 PCT
WET BULB TEMP  22 C            BARO.  737.6 MM  HG.     MEASURED FUEL  0.00 KG
SPEC. HUM.  15.9 GRAM/KG

  RUN DURATION             12.77 MINUTES
  BLOWER INLET PRESS. 1529.1  MM. H2O
  BLOWER DIF.  PRESS. 1775.5  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9997
  DISTANCE TRAVELED   16.62  KILOMETRES
  BLOWER REVOLUTIONS     15702
  BLOWER CU. CM /REV.  7654

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                  66.8/3
   HC   SAMPLE  PPM                                    668
   HC   BACKGRD METER READING/SCALE                   2.2/3
   HC   BACKGRD PPM                                     22
   CO   SAMPLE  METER READING/SCALE                  46.7/3
   CO   SAMPLE  PPM                                   1141
   CO   BACKGRD METER READING/SCALE                    .4/3
   CO   BACKGRD PPM                                      9
   CO2 SAMPLE  METER READING/SCALE                  60.9/3
   CO2 SAMPLE  PERCENT                               1.08
   CO2 BACKGRD METER READING/SCALE                   4.6/3
   CO2 BACKGRD PERCENT                                .07
   NOX SAMPLE  METER READING/SCALE                  30.6/2
   NOX SAMPLE  PPM                                   30.6
   NOX BACKGRD METER READING/SCALE                    .7/2
   NOX BACKGRD PPM                                     .7
   HC   CONCENTRATION PPM                              648
   CO   CONCENTRATION PPM                             1082
   CO2 CONCENTRATION PCT                             1.02
   NOX CONCENTRATION PPM                             30.0
   SO2 COCENTRATION PPM                               0.0
   HC   MASS (GRAMS)                                 34.22
   CO   MASS (GRAMS)                                115.36
   CO2 MASS (GRAMS)                                1712.09
   NOX MASS (GRAMS)                                  6.33
   SO2 MASS (GRAMS)                                  0.00

  HC   GRAMS/KILOMETRE      2.06
  CO   GRAMS/KILOMETRE      6.94
  CO2 GRAMS/KILOMETRE    103.03
  NOX GRAMS/KILOMETRE       .38
  SO2 GRAMS/KILOMETRE      0.00

  HC   GRAMS/KG OF FUEL  54.18      HC   GRAMS/MIN    2.68
  CO   GRAMS/KG OF FUEL  182.6      CO   GRAMS/MIN     9.0
  CO2 GRAMS/KG OF FUEL   2711      CO2 GRAMS/MIN     134
  NOX GRAMS/KG OF FUEL  10.02      NOX GRAMS/MIN     .50
  SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN    0.00
  CARBON BALANCE FUEL ECONOMY                    19.33  KILOMETRES/LITRE
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                             TABLE
                                                      VEHICLE EMISSION RESULTS
UNIT NO.  010          TEST NO. 1              1975  LIGHT DUTY EMISSIONS TEST
VEHICLE MODEL  RE-5  +CATALYST ONLY    DATE  6/ 8/77
                                       ENGINE     .49 LITRE 0                MFGR. CODE    -0
                                                                             CURB WT.      0 KG               YR.  1976
BAROMETER 739.14 MM OF HG.                                                                                    GVM      0 KG
DRY BULB TEMP.    25.6 DEG. C
REL. HUMIDITY      64 PCT.                                                 WET BULB TEMP  20.6 DEG. C
                                                                           ABS. HUMIDITY  13.4 GRAMS/KG
EXHAUST EMISSIONS                                                          DYNO ROLL CONSTANT   967.97

    BLOWER DIF. PRESS., G2, +20.5 MM. H20                                  BLOWER INLET PRESS., G1 +47.8 MM. H20
    BAG RESULTS                                                            BLOWER INLET TEMP.   43 DEG. C
    BAG NO.
    BLOWER REVOLUTIONS                           1                  2                  3
    ROLL COUNTS                                10420              17806              10372
    HC   SAMPLE  METER READING/SCALE            3552               3833               3528
    HC   SAMPLE  PPM                           52.0/3             41.0/3             35.9/3
    HC   BACKGRD METER READING/SCALE            520                410                359
    HC   BACKGRD PPM                            1.8/3              2.2/3              2.1/3
    CO   SAMPLE  METER READING/SCALE             18                 22                 21
    CO   SAMPLE  PPM                           54.2/3             55.7/3             44.8/3
    CO   BACKGRD METER READING/SCALE           1347               1390               1090
    CO   BACKGRD PPM                             .2/3               .1/3               .1/3
    CO2  SAMPLE  METER READING/SCALE              4                  2                  2
    CO2  SAMPLE  PERCENT                       47.1/3             34.1/3             46.4/3
    CO2  BACKGRD METER READING/SCALE            .81                .57                .80
    CO2  BACKGRD PERCENT                        3.7/3              3.4/3              3.5/3
    NOX  SAMPLE  METER READING/SCALE            .06                .05                .05
    NOX  SAMPLE  PPM                            6.3/2              1.6/2              5.4/2
    NOX  BACKGRD METER READING/SCALE            6.3                1.6                5.4
    NOX  BACKGRD PPM                             .5/2               .4/2               .4/2
    SO2  SAMPLE  METER READING/SCALE             .5                 .4                 .4
    SO2  SAMPLE  PPM                          -0.0/*             -0.0/*             -0.0/*
    SO2  BACKGRD METER READING/SCALE            0.0                0.0                0.0
    SO2  BACKGRD PPM                          -0.0/*             -0.0/*             -0.0/*
                                                0.0                0.0                0.0
    HC   CONCENTRATION PPM
    CO   CONCENTRATION PPM                      503                389                339
    CO2  CONCENTRATION PCT                     1295               1344               1049
    NOX  CONCENTRATION PPM                      .76                .52                .75
    SO2  CONCENTRATION PPM                      5.8                1.2                5.0
    HC   MASS GRAMS                             0.0                0.0                0.0
    CO   MASS GRAMS                           18.81              24.85              12.63
    CO2  MASS GRAMS                           97.67             173.24              78.76
    NOX  MASS GRAMS                          904.32            1059.07             887.36
    SO2  MASS GRAMS                             .79                .28                .68
    TOTAL CARBON GRAMS                         0.00               0.00               0.00
                                             304.97             384.84             286.88

    WEIGHTED MASS HC        3.28 GRAMS/KILOMETRE
    WEIGHTED MASS CO       21.23 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     159.45 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        .09 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        12.25 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  11.6  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST                  976.69 GRAMS
    ESTIMATED FUEL WEIGHT =  1.13KG.
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       TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                                VEHICLE NUMBER 010

  DATE  6/ 7/77                 TIME     -0 HRS.        TEST NO.  1
  MODEL  1976 SUZUKI RE-5 FET CATALYST ONLY             ENGINE  .5 LITRE  0
  DRIVER   KN                   TEST WT.      0 KG.     GVW    0 KG
  WET BULB TEMP  21 C           DRY BULB TEMP  26 C     REL. HUM.  63.7 PCT
  SPEC. HUM.  13.4 GRAM/KG   BARO.  739.1 MM  HG.    MEASURED FUEL  0.00 KG

   RUN DURATION           12.77 MINUTES
   BLOWER INLET PRESS. 1373.2  MM. H2O
   BLOWER DIF.  PRESS. 1639.3  MM  H2O
   BLOWER INLET TEMP.      43  DEG. C
   DYNO REVOLUTIONS     10054
   DISTANCE TRAVELED   16.71  KILOMETRES
   BLOWER REVOLUTIONS    15710
   BLOWER CU. CM /REV.  8051

   BAG RESULTS
    HC   SAMPLE  METER READING/SCALE                 25.7/3
    HC   SAMPLE  PPM                                  257
    HC   BACKGRD METER READING/SCALE                  1.7/3
    HC   BACKGRD PPM                                   17
    CO   SAMPLE  METER READING/SCALE                 38.6/3
    CO   SAMPLE  PPM                                  927
    CO   BACKGRD METER READING/SCALE                   .1/3
    CO   BACKGRD PPM                                    2
    CO2  SAMPLE  METER READING/SCALE                 68.1/3
    CO2  SAMPLE  PERCENT                             1.23
    CO2  BACKGRD METER READING/SCALE                  3.6/3
    CO2  BACKGRD PERCENT                              .06
    NOX  SAMPLE  METER READING/SCALE                 14.1/2
    NOX  SAMPLE  PPM                                 14.1
    NOX  BACKGRD METER READING/SCALE                  .5/2
    NOX  BACKGRD PPM                                   .5
    HC   CONCENTRATION PPM                            242
    CO   CONCENTRATION PPM                            884
    CO2  CONCENTRATION PCT                           1.18
    NOX  CONCENTRATION PPM                           13.6
    SO2  COCENTRATION PPM                            0.0
    HC   MASS (GRAMS)                               13.55
    CO   MASS (GRAMS)                              100.07
    CO2  MASS (GRAMS)                             2102.82
    NOX  MASS (GRAMS)                                2.79
    SO2  MASS (GRAMS)                                0.00

 HC   GRAMS/KILOMETRE       .81
 CO   GRAMS/KILOMETRE      5.99
 CO2  GRAMS/KILOMETRE    125.83
 NOX  GRAMS/KILOMETRE       .17
 SO2  GRAMS/KILOMETRE      0.00

 HC   GRAMS/KG OF FUEL  18.65       HC   GRAMS/MIN    1.06
 CO   GRAMS/KG OF FUEL  137.7       CO   GRAMS/MIN     7.8
 CO2  GRAMS/KG OF FUEL   2894       CO2  GRAMS/MIN     165
 NOX  GRAMS/KG OF FUEL   3.84       NOX  GRAMS/MIN     .22
 SO2  GRAMS/KG OF FUEL   0.00       SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY
                                              16.90  KILOMETRES/LITRE
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                    TABLE                     VEHICLE EMISSION RESULTS
                                        1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  010        TEST NO. 1          DATE  6/20/77                       MFGR. CODE    -0                    YR.  1976
VEHICLE MODEL  RE-5 CAT + AIR            ENGINE     .51 LITRE 0              CURB WT.       0 KG                 GVW      0 KG

BAROMETER 741.68 MM OF HG.                                                   WET BULB TEMP  21.1 DEG. C
DRY BULB TEMP.    26.7 DEG. C                                                ABS. HUMIDITY  13.7 GRAMS/KG
REL. HUMIDITY      61 PCT.                                                   DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                             BLOWER INLET PRESS., G1 *83.4 MM. H2O
    BLOWER DIF. PRESS., G2, *38.3 MM. H2O                                    BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                         1               2               3
    BLOWER REVOLUTIONS                            10381           17806           10442
    ROLL COUNTS                                    3449            3749            3468
    HC   SAMPLE  METER READING/SCALE              20.8/3          58.3/2          13.7/3
    HC   SAMPLE  PPM                               208              58             137
    HC   BACKGRD METER READING/SCALE               2.5/3           2.3/3          18.8/2
    HC   BACKGRD PPM                                25              23              19
    CO   SAMPLE  METER READING/SCALE              82.1/*          65.1/*          75.3/*
    CO   SAMPLE  PPM                               379             268             331
    CO   BACKGRD METER READING/SCALE               3.3/*           3.5/*           1.1/*
    CO   BACKGRD PPM                                10              10               3
    CO2  SAMPLE  METER READING/SCALE              46.2/3          39.5/3          45.6/3
    CO2  SAMPLE  PERCENT                           .79             .67             .78
    CO2  BACKGRD METER READING/SCALE               3.6/3           3.6/3           3.2/3
    CO2  BACKGRD PERCENT                           .06             .06             .05
    NOX  SAMPLE  METER READING/SCALE              12.2/2           3.0/2          12.2/2
    NOX  SAMPLE  PPM                              12.2             3.0            12.2
    NOX  BACKGRD METER READING/SCALE               .5/2            .4/2            .4/2
    NOX  BACKGRD PPM                                .5              .4              .4
    SO2  SAMPLE  METER READING/SCALE             -0.0/*          -0.0/*          -0.0/*
    SO2  SAMPLE  PPM                               0.0             0.0             0.0
    SO2  BACKGRD METER READING/SCALE             -0.0/*          -0.0/*          -0.0/*
    SO2  BACKGRD PPM                               0.0             0.0             0.0

    HC   CONCENTRATION PPM                         185              37             119
    CO   CONCENTRATION PPM                         357             250             317
    CO2  CONCENTRATION PCT                         .74             .62             .74
    NOX  CONCENTRATION PPM                        11.7             2.6            11.8
    SO2  CONCENTRATION PPM                         0.0             0.0             0.0
    HC   MASS GRAMS                               6.86            2.33            4.46
    CO   MASS GRAMS                              26.77           32.14           23.90
    CO2  MASS GRAMS                             880.56         1253.00          878.81
    NOX  MASS GRAMS                               1.60             .61            1.63
    SO2  MASS GRAMS                               0.00            0.00            0.00
    TOTAL CARBON GRAMS                          257.75          357.77          253.96

    WEIGHTED MASS HC        .65 GRAMS/KILOMETRE
    WEIGHTED MASS CO       4.78 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    177.97 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .19 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.98 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  12.5  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              869.47 GRAMS
    ESTIMATED FUEL WEIGHT =  1.00KG.
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       TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 010

DATE  6/20/77               TIME     -0 HRS.         TEST NO.  1
MODEL  1976 SUZUKI RE-5 FET CATALYST+AIR             ENGINE  .5 LITRE  0
DRIVER   KN                 TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  19 C         DRY BULB TEMP  25 C      REL. HUM.  59.6 PCT
SPEC. HUM.  12.1 GRAM/KG    BARO.  741.7 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION          12.79 MINUTES
  BLOWER INLET PRESS. 1485.9  MM. H2O
  BLOWER DIF.  PRESS. 1651.0  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9869
  DISTANCE TRAVELED   16.40  KILOMETRES
  BLOWER REVOLUTIONS    15743
  BLOWER CU. CM /REV.  8047

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              11.9/3
   HC   SAMPLE  PPM                               119
   HC   BACKGRD METER READING/SCALE               1.9/3
   HC   BACKGRD PPM                                19
   CO   SAMPLE  METER READING/SCALE              68.8/*
   CO   SAMPLE  PPM                               156
   CO   BACKGRD METER READING/SCALE               1.0/*
   CO   BACKGRD PPM                                 2
   CO2  SAMPLE  METER READING/SCALE              68.7/3
   CO2  SAMPLE  PERCENT                          1.24
   CO2  BACKGRD METER READING/SCALE               3.2/3
   CO2  BACKGRD PERCENT                           .05
   NOX  SAMPLE  METER READING/SCALE              37.4/2
   NOX  SAMPLE  PPM                              37.4
   NOX  BACKGRD METER READING/SCALE                .7/2
   NOX  BACKGRD PPM                                 .7
   HC   CONCENTRATION PPM                        102
   CO   CONCENTRATION PPM                        147
   CO2  CONCENTRATION PCT                        1.19
   NOX  CONCENTRATION PPM                        36.8
   SO2  COCENTRATION PPM                         0.0
   HC   MASS (GRAMS)                             5.73
   CO   MASS (GRAMS)                            16.75
   CO2  MASS (GRAMS)                          2142.89
   NOX  MASS (GRAMS)                             7.19
   SO2  MASS (GRAMS)                             0.00

HC   GRAMS/KILOMETRE        .35
CO   GRAMS/KILOMETRE       1.02
CO2  GRAMS/KILOMETRE     130.63
NOX  GRAMS/KILOMETRE        .44
SO2  GRAMS/KILOMETRE       0.00

HC   GRAMS/KG OF FUEL   8.31     HC   GRAMS/MIN     .45
CO   GRAMS/KG OF FUEL   24.3     CO   GRAMS/MIN     1.3
CO2  GRAMS/KG OF FUEL   3105     CO2  GRAMS/MIN     167
NOX  GRAMS/KG OF FUEL  10.42     NOX  GRAMS/MIN     .56
SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                       17.46  KILOMETRES/LITRE
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                  TABLE                          VEHICLE EMISSION RESULTS
                                             1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  010        TEST NO. 2       DATE  6/21/77                        MFGR. CODE    -0                 YR.  1976
VEHICLE MODEL  RE-5 CAT + AIR         ENGINE     .51 LITRE 0                CURB WT.      0 KG               GVW      0 KG

BAROMETER 742.19 MM OF HG.                                          WET BULB TEMP  18.9 DEG. C
DRY BULB TEMP.    25.6 DEG. C                                       ABS. HUMIDITY  11.1 GRAMS/KG
REL. HUMIDITY      53 PCT.                                          DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS

     BLOWER DIF. PRESS., G2, *25.6 MM. H2O                          BLOWER INLET PRESS., G1 *47.8 MM. H2O
     BAG RESULTS                                                    BLOWER INLET TEMP.    43 DEG. C
     BAG NO.                                        1                   2                   3
     BLOWER REVOLUTIONS                          10377               17810               10367
     ROLL COUNTS                                  3454                3762                3482
     HC    SAMPLE  METER READING/SCALE          17.7/3              53.7/2              79.1/2
     HC    SAMPLE  PPM                            177                  54                  79
     HC    BACKGRD METER READING/SCALE           1.9/3               2.1/3              15.0/2
     HC    BACKGRD PPM                             19                  21                  15
     CO    SAMPLE  METER READING/SCALE          68.0/*              65.0/*              68.7/*
     CO    SAMPLE  PPM                            285                 267                 155
     CO    BACKGRD METER READING/SCALE            .8/*               1.8/*               1.1/*
     CO    BACKGRD PPM                              2                   5                   3
     CO2   SAMPLE  METER READING/SCALE          42.8/3              37.8/3              42.0/3
     CO2   SAMPLE  PERCENT                        .73                 .64                 .72
     CO2   BACKGRD METER READING/SCALE           2.8/3               2.9/3               3.4/3
     CO2   BACKGRD PERCENT                        .04                 .04                 .05
     NOX   SAMPLE  METER READING/SCALE          13.5/2               2.8/2              13.5/2
     NOX   SAMPLE  PPM                           13.5                 2.8                13.5
     NOX   BACKGRD METER READING/SCALE            .6/2                .5/2                .4/2
     NOX   BACKGRD PPM                             .6                  .5                  .4
     SO2   SAMPLE  METER READING/SCALE          -0.0/*              -0.0/*              -0.0/*
     SO2   SAMPLE  PPM                            0.0                 0.0                 0.0
     SO2   BACKGRD METER READING/SCALE          -0.0/*              -0.0/*              -0.0/*
     SO2   BACKGRD PPM                            0.0                 0.0                 0.0

     HC    CONCENTRATION PPM                      159                  34                  65
     CO    CONCENTRATION PPM                      274                 255                 148
     CO2   CONCENTRATION PCT                      .69                 .59                 .67
     NOX   CONCENTRATION PPM                     12.9                 2.3                13.1
     SO2   CONCENTRATION PPM                      0.0                 0.0                 0.0
     HC    MASS GRAMS                            5.95                2.17                2.43
     CO    MASS GRAMS                           20.68               33.00               11.13
     CO2   MASS GRAMS                          822.54             1217.53              793.13
     NOX   MASS GRAMS                            1.62                 .50                1.65
     SO2   MASS GRAMS                            0.00                0.00                0.00
     TOTAL CARBON GRAMS                        238.51              348.31              223.33

     WEIGHTED MASS HC         .51 GRAMS/KILOMETRE
     WEIGHTED MASS CO        4.01 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     160.31 GRAMS/KILOMETRE
     WEIGHTED MASS NOX        .18 GRAMS/KILOMETRE
     WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE        12.02 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  13.3  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST             810.15 GRAMS
     ESTIMATED FUEL WEIGHT =   .94KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 010

DATE  6/21/77                     TIME    -0 HRS.           TEST NO.  2
MODEL  1976 SUZUKI RE-5 FET CATALYST+AIR                    ENGINE  .5 LITRE  0
DRIVER   KN                       TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  18 C               DRY BULB TEMP  27 C       REL. HUM.  44.9 PCT
SPEC. HUM.   9.9 GRAM/KG          BARO.  741.7 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION          12.76 MINUTES
  BLOWER INLET PRESS. 1473.2  MM. H2O
  BLOWER DIF.  PRESS. 1625.6  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9798
  DISTANCE TRAVELED    16.29  KILOMETRES
  BLOWER REVOLUTIONS    15705
  BLOWER CU. CM /REV.  8062

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                 10.0/3
   HC   SAMPLE  PPM                                  100
   HC   BACKGRD METER READING/SCALE                  1.4/3
   HC   BACKGRD PPM                                   14
   CO   SAMPLE  METER READING/SCALE                 59.2/*
   CO   SAMPLE  PPM                                  131
   CO   BACKGRD METER READING/SCALE                  1.7/*
   CO   BACKGRD PPM                                    3
   CO2  SAMPLE  METER READING/SCALE                 63.7/3
   CO2  SAMPLE  PERCENT                             1.14
   CO2  BACKGRD METER READING/SCALE                  3.7/3
   CO2  BACKGRD PERCENT                              .06
   NOX  SAMPLE  METER READING/SCALE                 37.9/2
   NOX  SAMPLE  PPM                                 37.9
   NOX  BACKGRD METER READING/SCALE                   .7/2
   NOX  BACKGRD PPM                                   .7
   HC   CONCENTRATION PPM                             87
   CO   CONCENTRATION PPM                            123
   CO2  CONCENTRATION PCT                           1.09
   NOX  CONCENTRATION PPM                           37.3
   SO2  COCENTRATION PPM                            0.0
   HC   MASS (GRAMS)                                4.92
   CO   MASS (GRAMS)                               14.01
   CO2  MASS (GRAMS)                             1949.90
   NOX  MASS (GRAMS)                                6.78
   SO2  MASS (GRAMS)                                0.00

 HC   GRAMS/KILOMETRE       .30
 CO   GRAMS/KILOMETRE       .86
 CO2  GRAMS/KILOMETRE    119.72
 NOX  GRAMS/KILOMETRE       .92
 SO2  GRAMS/KILOMETRE      0.00

 HC   GRAMS/KG OF FUEL   7.84      HC   GRAMS/MIN    .39
 CO   GRAMS/KG OF FUEL   22.3      CO   GRAMS/MIN    1.1
 CO2  GRAMS/KG OF FUEL   3109      CO2  GRAMS/MIN    153
 NOX  GRAMS/KG OF FUEL  10.82      NOX  GRAMS/MIN    .53
 SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                       19.08  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda GL-1000

Date 2/11/77 Sequence GLS-1 Baseline

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1000	----	2.37	11.40	3.7	33.	8,480
20	2	2200	0.46	2.37	12.74	1.7	110.	7,040
30	3	2700	1.10	0.59	13.18	2.5	275.	4,640
40	4	3000	2.14	0.70	14.13	1.4	525.	1,260
50	5	3200	3.33	0.50	14.53	1.0	1025.	1,460
60	5	3800	4.85	1.55	14.26	0.5	1225.	2,060
Idle	N	1000	----	2.48	11.44	3.6	45.	10,300

Notes: Carburetors - set as received
After 1000 mi break-in maintenance
Timing - in spec; no temperature data taken

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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda GL-1000

Date 3/28/77 Sequence GLS-2 - Chevette Reed Valves Added

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1050	-	1.98	10.01	6.6	30	5,440	Minor reaction
20	2	2300	0.60	1.60	11.67	4.3	71	4,670	possible reaction, but most likely the result of dilution
30	3	2700	1.33	0.59	11.56	4.8	260	3,440	
40	4	3000	2.40	0.47	12.18	3.9	475	1,140	
50	5	3200	3.70	0.44	12.74	3.4	950	1,060	
60	5	3800	5.31	1.38	12.92	2.1	1240	1,480	
Idle	N	1050	-	1.93	10.28	5.8	35	4,640	

Notes: Carburetors: as received - insulation applied to all 4 pipes back to beginning of muffler.
Max. head temp. 140°C at 60 mph
Max. exhaust gas temp. of right front cylinder - 730°C @ 60 mph
Max. exhaust gas temp. of right rear cylinder - 725°C @ 40 mph

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda GL-1000

Date 4/24/77 Sequence GLS-3

Condition				Concentrations					Right Catalyst		Left Catalyst	
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Enter	Exit	Enter	Exit
Idle	N	1000	----	1.00	10.99	6.3	18.	2,840	120	220	230	235
20	2	2200	0.58	0.06	13.70	3.4	43.	690	255	325	370	385
30	3	2850	1.32	0.019	14.04	3.0	200.	210	270	340	375	400
40	4	3000	2.41	0.015	14.13	2.9	300.	90	300	345	425	455
50	5	3100	3.73	0.047	14.66	2.1	405.	160	340	350	450	440
60	5	3800	5.43	1.95	14.40	1.2	670.	2,110	395	410	500	470
Idle	N	1200	----	1.05	11.44	5.5	6.	2,380	230	365	280	425

Notes: Engelhard catalyst No. PTX 413 located approx. 18 inches from exhaust port
Carburetors as received: no air added: exhaust system dropped 2 inches
Max. head temp. approx. 135°C at 60 mph
WOT accel 5.95 sec.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda GL-1000

Date 5/10/77 Sequence GLS-4

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1050	----	0.40	11.79	4.5	22.	1,520
20	2	2200	0.62	0.01	13.39	2.5	95.	285
30	3	2850	1.32	0.01	12.76	3.5	295.	380
40	4	3000	2.40	0.01	13.11	3.1	450.	175
50	5	3200	3.76	0.01	13.65	2.4	840.	160
60	5	3900	5.37	0.87	14.40	0.8	305.	450
Idle	N	1100	----	0.65	12.53	3.5	31.	1,310

Notes: Air injected by Chevette reed valve on each exhaust port; average air injected, 0.65 cfm total at each speed (based on flow measurement of two valv
Max. cat. exit temp. - 490°C at 60 mph (left); 390°C at 60 mph (right)
Max. head temp. - 140°C at 60 mph

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda GL-1000

Date 6/1/77 Sequence GLS-5

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Air Flow Rate, cfm
Idle	N	750	----	0.38	10.17	7.0	19.	808	0.32
20	2	2300	0.59	0.01	13.11	3.0	36.	136	0.77
30	3	2700	1.39	0.01	12.26	4.1	295.	364	0.91
40	4	3000	2.40	0.01	12.82	3.5	495.	204	0.98
50	5	3200	3.76	0.01	13.75	2.2	860.	200	1.02
60	5	3800	5.40	0.29	14.45	0.8	295.	288	1.27
Idle	N	1100	----	0.50	10.50	6.6	18.	792	0.32

Notes: Air injected by No. 1033 pump run at 1:1 ratio

Max. catalyst exit temp. - 550°C at 60 mph left; 485°C at 60 mph (right)

Max. head temp. - 125°C at 60 mph

WOT accel. time 0 - 100 kph = 6.2 sec

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                    TABLE                           VEHICLE EMISSION RESULTS
                                               1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  900         TEST NO. 1             DATE 10/ 6/76                    MFGR. CODE   -0                   YR.  1976
VEHICLE MODEL   HONDA GL 1000                ENGINE    1.00 LITRE 4           CURB WT.      0 KG                GVM      0 KG

BAROMETER 740.16 MM OF HG.                                                    WET BULB TEMP  15.6 DEG. C
DRY BULB TEMP.    26.7 DEG. C                                                 ABS. HUMIDITY    6.5 GRAMS/KG
REL. HUMIDITY      29 PCT.                                                    DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                              BLOWER INLET PRESS., G1 *25.6 MM. H2O
    BLOWER DIF. PRESS., G2, *90.7 MM. H2O                                     BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                         1             2             3
    BLOWER REVOLUTIONS                          10407         17799         10403
    ROLL COUNTS                                  3436          3685          3440
    HC   SAMPLE  METER READING/SCALE            55.1/3        36.8/3        32.7/3
    HC   SAMPLE  PPM                             551           368           327
    HC   BACKGRD METER READING/SCALE             3.8/3         5.7/3         2.4/3
    HC   BACKGRD PPM                              38            57            24
    CO   SAMPLE  METER READING/SCALE            23.7/2        18.5/2        18.9/2
    CO   SAMPLE  PPM                             976           744           761
    CO   BACKGRD METER READING/SCALE              .4/2          .2/2          .1/2
    CO   BACKGRD PPM                              15             8             4
    CO2  SAMPLE  METER READING/SCALE            38.8/3        29.3/3        35.0/3
    CO2  SAMPLE  PERCENT                          .66           .48           .59
    CO2  BACKGRD METER READING/SCALE             4.1/3         4.3/3         4.9/3
    CO2  BACKGRD PERCENT                          .06           .07           .08
    NOX  SAMPLE  METER READING/SCALE            35.9/2        11.3/2        23.8/2
    NOX  SAMPLE  PPM                            35.9          11.3          23.8
    NOX  BACKGRD METER READING/SCALE             1.3/2         1.1/2         1.1/2
    NOX  BACKGRD PPM                             1.3           1.1           1.1
    SO2  SAMPLE  METER READING/SCALE            -0.0/*        -0.0/*        -0.0/*
    SO2  SAMPLE  PPM                             0.0           0.0           0.0
    SO2  BACKGRD METER READING/SCALE            -0.0/*        -0.0/*        -0.0/*
    SO2  BACKGRD PPM                             0.0           0.0           0.0

    HC   CONCENTRATION PPM                       515           314           304
    CO   CONCENTRATION PPM                       940           722           742
    CO2  CONCENTRATION PCT                       .60           .42           .51
    NOX  CONCENTRATION PPM                      34.7          10.2          22.8
    SO2  CONCENTRATION PPM                       0.0           0.0           0.0
    HC   MASS GRAMS                            17.87         18.60         10.55
    CO   MASS GRAMS                            65.81         86.53         51.91
    CO2  MASS GRAMS                           659.47        794.55        568.47
    NOX  MASS GRAMS                             3.51          1.77          2.30
    SO2  MASS GRAMS                             0.00          0.00          0.00
    TOTAL CARBON GRAMS                        223.67        270.05        186.54

    WEIGHTED MASS HC        2.73 GRAMS/KILOMETRE
    WEIGHTED MASS CO       12.20 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     118.42 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        .39 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        11.84 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  16.1  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              680.26 GRAMS
    ESTIMATED FUEL WEIGHT =   .79KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 900

DATE 10/ 6/76                 TIME     -0 HRS.         TEST NO.  1
MODEL  1976 HONDA GL 1000     HIWAY CYCLE              ENGINE 0.0 LITRE  4
DRIVER   TJ                   TEST WT.        0 KG.    GVW     0 KG
WET BULB TEMP  16 C           DRY BULB TEMP  27 C      REL. HUM.  30.3 PCT
SPEC. HUM.    7.0 GRAM/KG     BARO.  739.6 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION             12.76 MINUTES
  BLOWER INLET PRESS. 1625.6  MM. H20
  BLOWER DIF.  PRESS. 1790.7  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9878
  DISTANCE TRAVELED   16.42  KILOMETRES
  BLOWER REVOLUTIONS    15690
  BLOWER CU. CM /REV.  7640

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                  21.8/3
   HC   SAMPLE  PPM                                   218
   HC   BACKGRD METER READING/SCALE                   1.7/3
   HC   BACKGRD PPM                                    17
   CO   SAMPLE  METER READING/SCALE                  16.4/2
   CO   SAMPLE  PPM                                   653
   CO   BACKGRD METER READING/SCALE                    .1/2
   CO   BACKGRD PPM                                     4
   CO2  SAMPLE  METER READING/SCALE                  52.9/3
   CO2  SAMPLE  PERCENT                                .92
   CO2  BACKGRD METER READING/SCALE                   4.0/3
   CO2  BACKGRD PERCENT                                .06
   NOX  SAMPLE  METER READING/SCALE                  59.7/2
   NOX  SAMPLE  PPM                                  59.7
   NOX  BACKGRD METER READING/SCALE                   1.4/2
   NOX  BACKGRD PPM                                   1.4
   HC   CONCENTRATION PPM                             202
   CO   CONCENTRATION PPM                             632
   CO2  CONCENTRATION PCT                             .87
   NOX  CONCENTRATION PPM                            58.4
   SO2  COCENTRATION PPM                              0.0
   HC   MASS (GRAMS)                                10.57
   CO   MASS (GRAMS)                                66.67
   CO2  MASS (GRAMS)                              1443.58
   NOX  MASS (GRAMS)                                 9.01
   SO2  MASS (GRAMS)                                 0.00

 HC   GRAMS/KILOMETRE        .64
 CO   GRAMS/KILOMETRE       4.06
 CO2  GRAMS/KILOMETRE      87.92
 NOX  GRAMS/KILOMETRE        .55
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  21.17     HC   GRAMS/MIN    .83
 CO   GRAMS/KG OF FUEL  133.6     CO   GRAMS/MIN    5.2
 CO2  GRAMS/KG OF FUEL   2892     CO2  GRAMS/MIN    113
 NOX  GRAMS/KG OF FUEL  18.05     NOX  GRAMS/MIN    .71
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                   24.17  KILOMETRES/LITRE
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                TABLE                    VEHICLE EMISSION RESULTS
                                   1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  900         TEST NO. 2       DATE 10/ 8/76                    MFGR. CODE   -0                  YR.  1976
VEHICLE MODEL  HONDA GL 1000           ENGINE    1.00 LITRE 4           CURB WT.     0 KG                GVM     0 KG

BAROMETER 748.54 MM OF HG.                                          WET BULB TEMP  14.4 DEG. C
DRY BULB TEMP.    24.4 DEG. C                                       ABS. HUMIDITY   6.1 GRAMS/KG
REL. HUMIDITY      32 PCT.                                          DYNO ROLL CONSTANT   967.67

EXHAUST EMISSIONS
                                                                    BLOWER INLET PRESS., G1 *00.2 MM. H2O
     BLOWER DIF. PRESS., G2, *90.7 MM. H2O                          BLOWER INLET TEMP.    43 DEG. C
     BAG RESULTS
     BAG NO.                                    1             2             3
     BLOWER REVOLUTIONS                       10393         17826         10384
     PULL COUNTS                               3541          3795          3539
     HC    SAMPLE  METER READING/SCALE         47.5/3        37.4/3        30.9/3
     HC    SAMPLE  PPM                          475           374           309
     HC    BACKGRD METER READING/SCALE         1.9/3         1.4/3         1.7/3
     HC    BACKGRD PPM                          19            14            17
     CO    SAMPLE  METER READING/SCALE         35.8/3        26.9/3        27.7/3
     CO    SAMPLE  PPM                          854           629           649
     CO    BACKGRD METER READING/SCALE          .4/3          .4/3          .5/3
     CO    BACKGRD PPM                           9             9            11
     CO2   SAMPLE  METER READING/SCALE         35.9/3        25.7/3        29.9/3
     CO2   SAMPLE  PERCENT                      .60           .42           .49
     CO2   BACKGRD METER READING/SCALE         1.6/3         2.2/3         2.4/3
     CO2   BACKGRD PERCENT                      .02           .03           .04
     NOX   SAMPLE  METER READING/SCALE         33.1/2        10.4/2        24.2/2
     NOX   SAMPLE  PPM                         33.1          10.4          24.2
     NOX   BACKGRD METER READING/SCALE         1.2/2         1.1/2         1.1/2
     NOX   BACKGRD PPM                         1.2           1.1           1.1
     SO2   SAMPLE  METER READING/SCALE        -0.0/*        -0.0/*        -0.0/*
     SO2   SAMPLE  PPM                         0.0           0.0           0.0
     SO2   BACKGRD METER READING/SCALE        -0.0/*        -0.0/*        -0.0/*
     SO2   BACKGRD PPM                         0.0           0.0           0.0

     HC    CONCENTRATION PPM                    457           361           293
     CO    CONCENTRATION PPM                    827           609           626
     CO2   CONCENTRATION PCT                    .58           .39           .46
     NOX   CONCENTRATION PPM                   32.0           9.3          23.1
     SO2   CONCENTRATION PPM                    0.0           0.0           0.0
     HC    MASS GRAMS                         16.12         21.82         10.32
     CO    MASS GRAMS                         58.94         74.41         44.53
     CO2   MASS GRAMS                        651.44        747.69        515.70
     NOX   MASS GRAMS                          3.25          1.63          2.35
     SO2   MASS GRAMS                          0.00          0.00          0.00
     TOTAL CARBON GRAMS                       217.02        254.85        168.77

     WEIGHTED MASS HC       2.84 GRAMS/KILOMETRE
     WEIGHTED MASS CO      10.26 GRAMS/KILOMETRE
     WEIGHTED MASS CO2    108.38 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .36 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       12.20 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  17.6  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST              640.65 GRAMS
     ESTIMATED FUEL WEIGHT =   .74KG.
     TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 900

DATE 10/ 8/76               TIME     -0 HRS.           TEST NO.  2
MODEL  1976 HONDA GL 1000   HIWAY CYCLE                ENGINE 1.0 LITRE  4
DRIVER   TJ                 TEST WT.        0 KG.      GVW    0 KG
WET BULB TEMP  15 C         DRY BULB TEMP  25 C        REL. HUM.  32.7 PCT
SPFC. HUM.   6.5 GRAM/KG    BARO.  748.0 MM  HG.       MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS. 1600.2  MM. H2O
  BLOWER DIF.  PRESS. 1790.7  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10123
  DISTANCE TRAVELED    16.83  KILOMETRES
  BLOWER REVOLUTIONS     15699
  BLOWER CU. CM /REV.  7654

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE               21.4/3
   HC   SAMPLE  PPM                                214
   HC   BACKGRD METER READING/SCALE                1.1/3
   HC   BACKGRD PPM                                 11
   CO   SAMPLE  METER READING/SCALE               30.2/3
   CO   SAMPLE  PPM                                711
   CO   BACKGRD METER READING/SCALE                 .5/3
   CO   BACKGRD PPM                                 11
   CO2  SAMPLE  METER READING/SCALE               53.0/3
   CO2  SAMPLE  PERCENT                             .93
   CO2  BACKGRD METER READING/SCALE                4.5/3
   CO2  BACKGRD PERCENT                             .07
   NOX  SAMPLE  METER READING/SCALE               61.2/2
   NOX  SAMPLE  PPM                               61.2
   NOX  BACKGRD METER READING/SCALE                1.1/2
   NOX  BACKGRD PPM                                1.1
   HC   CONCENTRATION PPM                          204
   CO   CONCENTRATION PPM                          681
   CO2  CONCENTRATION PCT                          .86
   NOX  CONCENTRATION PPM                         60.2
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                             10.85
   CO   MASS (GRAMS)                             73.25
   CO2  MASS (GRAMS)                           1462.06
   NOX  MASS (GRAMS)                              9.34
   SO2  MASS (GRAMS)                              0.00

 HC   GRAMS/KILOMETRE        .64
 CO   GRAMS/KILOMETRE       4.35
 CO2  GRAMS/KILOMETRE      86.84
 NOX  GRAMS/KILOMETRE        .55
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  21.34     HC   GRAMS/MIN     .85
 CO   GRAMS/KG OF FUEL  144.0     CO   GRAMS/MIN     5.7
 CO2  GRAMS/KG OF FUEL   2875     CO2  GRAMS/MIN     115
 NOX  GRAMS/KG OF FUEL  18.36     NOX  GRAMS/MIN     .73
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                      24.31  KILOMETRES/LITRE
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                    TABLE                  VEHICLE EMISSION RESULTS
                                     1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  900       TEST NO. 1       DATE  3/28/77                MFGR. CODE   -0                   YR.  1976
VEHICLE MODEL  GL-1000 1ST STEP, REED-AIR  ENGINE   1.03 LITRE 4  CURB WT.     0 KG                 GVM      0 KG

BAROMETER 734.31 MM OF HG.                                     WET BULB TEMP  17.2 DEG. C
DRY BULB TEMP.   25.6 DEG. C                                   ABS. HUMIDITY   9.1 GRAMS/KG
REL. HUMIDITY     43 PCT.                                      DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                               BLOWER INLET PRESS., G1 *98.6 MM. H2O
    BLOWER DIF. PRESS., G2, *76.4 MM. H2O                      BLOWER INLET TEMP.   43 DEG. C
    BAG RESULTS
    BAG NO.                                     1            2            3
    BLOWER REVOLUTIONS                        10433        17833        10435
    ROLL COUNTS                                3526         3822         3551
    HC   SAMPLE  METER READING/SCALE          36.9/3       31.7/3       27.6/3
    HC   SAMPLE  PPM                           369          317          276
    HC   BACKGRD METER READING/SCALE           1.5/3        1.7/3        1.8/3
    HC   BACKGRD PPM                            15           17           18
    CO   SAMPLE  METER READING/SCALE          32.0/3       20.5/3       30.5/3
    CO   SAMPLE  PPM                           757          471          719
    CO   BACKGRD METER READING/SCALE           .1/3         .2/3         .3/3
    CO   BACKGRD PPM                             2            4            6
    CO2  SAMPLE  METER READING/SCALE          40.5/3       29.2/3       35.4/3
    CO2  SAMPLE  PERCENT                       .69          .48          .59
    CO2  BACKGRD METER READING/SCALE           3.7/3        3.7/3        3.7/3
    CO2  BACKGRD PERCENT                       .06          .06          .06
    NOX  SAMPLE  METER READING/SCALE          36.7/2        9.9/2       25.8/2
    NOX  SAMPLE  PPM                          36.7          9.9         25.8
    NOX  BACKGRD METER READING/SCALE           .9/2         .7/2         .6/2
    NOX  BACKGRD PPM                            .9           .7           .6
    SO2  SAMPLE  METER READING/SCALE         -0.0/*       -0.0/*       -0.0/*
    SO2  SAMPLE  PPM                          0.0          0.0          0.0
    SO2  BACKGRD METER READING/SCALE         -0.0/*       -0.0/*       -0.0/*
    SO2  BACKGRD PPM                          0.0          0.0          0.0

    HC   CONCENTRATION PPM                     355          301          259
    CO   CONCENTRATION PPM                     734          456          695
    CO2  CONCENTRATION PCT                     .63          .43          .54
    NOX  CONCENTRATION PPM                    35.9          9.2         25.2
    SO2  CONCENTRATION PPM                     0.0          0.0          0.0
    HC   MASS GRAMS                          13.04        18.88         9.51
    CO   MASS GRAMS                          54.47        57.85        51.54
    CO2  MASS GRAMS                         742.23       855.01       631.70
    NOX  MASS GRAMS                           4.15         1.83         2.92
    SO2  MASS GRAMS                           0.00         0.00         0.00
    TOTAL CARBON GRAMS                      237.21       274.50       202.74

    WEIGHTED MASS HC       2.44 GRAMS/KILOMETRE
    WEIGHTED MASS CO       9.04 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    125.37 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .43 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.24 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  15.9  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST            714.45 GRAMS
    ESTIMATED FUEL WEIGHT =   .83KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 900

DATE  3/28/77                 TIME     -0 HRS.          TEST NO.  1
MODEL  1976 HONDA GL-1000 FET 1ST STEP,AIR BY REED ENGINE 1.0 LITRE  4
DRIVER   KN                   TEST WT.      0 KG.      GVW     0 KG
WET BULB TEMP  17 C           DRY BULB TEMP  26 C      REL. HUM.   37.7 PCT
SPEC. HUM.    8.2 GRAM/KG     BARO.  734.3 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS. 1985.9  MM. H2O
  BLOWER DIF.  PRESS. 1651.0  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10125
  DISTANCE TRAVELED    16.83  KILOMETRES
  BLOWER REVOLUTIONS    15722
  BLOWER CU. CM /REV.  8040

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE            17.9/3
   HC  SAMPLE  PPM                             179
   HC  BACKGRD METER READING/SCALE             1.4/3
   HC  BACKGRD PPM                              14
   CO  SAMPLE  METER READING/SCALE            28.7/3
   CO  SAMPLE  PPM                             674
   CO  BACKGRD METER READING/SCALE              .1/3
   CO  BACKGRD PPM                               2
   CO2 SAMPLE  METER READING/SCALE            53.2/3
   CO2 SAMPLE  PERCENT                         .93
   CO2 BACKGRD METER READING/SCALE             2.6/3
   CO2 BACKGRD PERCENT                         .04
   NOX SAMPLE  METER READING/SCALE            62.0/2
   NOX SAMPLE  PPM                            62.0
   NOX BACKGRD METER READING/SCALE              .7/2
   NOX BACKGRD PPM                              .7
   HC  CONCENTRATION PPM                      166
   CO  CONCENTRATION PPM                      652
   CO2 CONCENTRATION PCT                       .89
   NOX CONCENTRATION PPM                      61.4
   SO2 COCENTRATION PPM                       0.0
   HC  MASS (GRAMS)                           9.22
   CO  MASS (GRAMS)                          73.05
   CO2 MASS (GRAMS)                        1580.20
   NOX MASS (GRAMS)                          10.43
   SO2 MASS (GRAMS)                           0.00

 HC  GRAMS/KILOMETRE      .55
 CO  GRAMS/KILOMETRE     4.34
 CO2 GRAMS/KILOMETRE    93.89
 NOX GRAMS/KILOMETRE      .62
 SO2 GRAMS/KILOMETRE     0.00

 HC  GRAMS/KG OF FUEL  16.95     HC  GRAMS/MIN    .72
 CO  GRAMS/KG OF FUEL  134.3     CO  GRAMS/MIN    5.7
 CO2 GRAMS/KG OF FUEL   2905     CO2 GRAMS/MIN    124
 NOX GRAMS/KG OF FUEL  19.18     NOX GRAMS/MIN    .82
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                    22.73  KILOMETRES/LITRE
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                  TABLE                          VEHICLE EMISSION RESULTS
                                        1975  LIGHT DUTY EMISSIONS TEST
                                                                  MFGR. CODE    -0                YR.  1976
UNIT NO.  900        TEST NO. 1          DATE  4/29/77            CURB WT.       0 KG             GVM      0 KG
VEHICLE MODEL  GL-1000 CATALYST ONLY     ENGINE   1.03 LITRE 4

BAROMETER 742.95 MM OF HG.                                        WET BULB TEMP  20.0 DEG. C
DRY BULB TEMP.   25.0 DEG. C                                      ABS. HUMIDITY  12.8 GRAMS/KG
REL. HUMIDITY      63 PCT.                                        DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS                                                 BLOWER INLET PRESS., G1 *85.9 MM. H2O
                                                                  BLOWER INLET TEMP.   43 DEG. C
     BLOWER DIF. PRESS., G2, *76.4 MM. H2O
     BAG RESULTS
     BAG NO.                                 1            2            3
     BLOWER REVOLUTIONS                   10410        17831        10393
     ROLL COUNTS                           3514         3815         3529
     HC   SAMPLE  METER READING/SCALE    16.2/3       47.6/2       75.9/2
     HC   SAMPLE  PPM                       162           48           76
     HC   BACKGRD METER READING/SCALE     1.2/3        1.2/3        9.7/2
     HC   BACKGRD PPM                        12           12           10
     CO   SAMPLE  METER READING/SCALE    83.6/*       75.3/*       77.8/*
     CO   SAMPLE  PPM                       390          173          348
     CO   BACKGRD METER READING/SCALE     1.3/*        1.2/*        2.0/*
     CO   BACKGRD PPM                         4            4            4
     CO2  SAMPLE  METER READING/SCALE    40.9/3       32.8/3       39.3/3
     CO2  SAMPLE  PERCENT                   .69          .55          .66
     CO2  BACKGRD METER READING/SCALE     3.9/3        3.3/3        4.3/3
     CO2  BACKGRD PERCENT                   .06          .05          .07
     NOX  SAMPLE  METER READING/SCALE    13.0/2        5.6/2        7.0/2
     NOX  SAMPLE  PPM                      13.0          5.6          7.0
     NOX  BACKGRD METER READING/SCALE      .6/2         .4/2         .4/2
     NOX  BACKGRD PPM                        .6           .4           .4
     SO2  SAMPLE  METER READING/SCALE    -0.0/*       -0.0/*       -0.0/*
     SO2  SAMPLE  PPM                       0.0          0.0          0.0
     SO2  BACKGRD METER READING/SCALE    -0.0/*       -0.0/*       -0.0/*
     SO2  BACKGRD PPM                       0.0          0.0          0.0

     HC   CONCENTRATION PPM                 151           36           67
     CO   CONCENTRATION PPM                 373          165          333
     CO2  CONCENTRATION PCT                 .64          .50          .60
     NOX  CONCENTRATION PPM                12.4          5.2          6.6
     SO2  CONCENTRATION PPM                 0.0          0.0          0.0
     HC   MASS GRAMS                       5.62         2.31         2.48
     CO   MASS GRAMS                      28.11        21.25        25.03
     CO2  MASS GRAMS                     758.35      1012.77       714.47
     NOX  MASS GRAMS                       1.65         1.19          .88
     SO2  MASS GRAMS                       0.00         0.00         0.00
     TOTAL CARBON GRAMS                  223.88       287.51       207.87

     WEIGHTED MASS HC       .50 GRAMS/KILOMETRE
     WEIGHTED MASS CO      3.90 GRAMS/KILOMETRE
     WEIGHTED MASS CO2   143.16 GRAMS/KILOMETRE
     WEIGHTED MASS NOX      .20 GRAMS/KILOMETRE
     WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE        12.20 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  15.6  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST              719.27 GRAMS
     ESTIMATED FUEL WEIGHT =   .83KG.
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      TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                             VEHICLE NUMBER 900

   DATE  4/29/77                 TIME    -0 HRS.        TEST NO.  1
   MODEL  1976 HONDA GL-1000 FET CATALYST ONLY          ENGINE 1.0 LITRE  4
   DRIVER   KN                   TEST WT.     0 KG.     GVW    0 KG
   WET BULB TEMP  19 C           DRY BULB TEMP  25 C    REL. HUM.  56.0 PCT
   SPEC. HUM.  11.3 GRAM/KG      BARO.  743.7 MM  HG.   MEASURED FUEL  0.00 KG

    RUN DURATION          12.76 MINUTES
    BLOWER INLET PRESS. 1485.9  MM. H2O
    BLOWER DIF.  PRESS. 1638.3  MM  H2O
    BLOWER INLET TEMP.     43  DEG. C
    DYNO REVOLUTIONS     9980
    DISTANCE TRAVELED   16.59  KILOMETRES
    BLOWER REVOLUTIONS    15712
    BLOWER CU. CM /REV.  8057

    BAG RESULTS
     HC   SAMPLE  METER READING/SCALE              79.3/2
     HC   SAMPLE  PPM                               79
     HC   BACKGRD METER READING/SCALE               9.7/2
     HC   BACKGRD PPM                               10
     CO   SAMPLE  METER READING/SCALE              95.3/*
     CO   SAMPLE  PPM                              491
     CO   BACKGRD METER READING/SCALE               1.3/*
     CO   BACKGRD PPM                                4
     CO2  SAMPLE  METER READING/SCALE              53.7/3
     CO2  SAMPLE  PERCENT                          .94
     CO2  BACKGRD METER READING/SCALE               2.9/3
     CO2  BACKGRD PERCENT                          .04
     NOX  SAMPLE  METER READING/SCALE              17.6/2
     NOX  SAMPLE  PPM                              17.6
     NOX  BACKGRD METER READING/SCALE                .8/2
     NOX  BACKGRD PPM                                .8
     HC   CONCENTRATION PPM                         70
     CO   CONCENTRATION PPM                        470
     CO2  CONCENTRATION PCT                        .90
     NOX  CONCENTRATION PPM                        16.9
     SO2  COCENTRATION PPM                         0.0
     HC   MASS (GRAMS)                             3.97
     CO   MASS (GRAMS)                            53.56
     CO2  MASS (GRAMS)                          1616.09
     NOX  MASS (GRAMS)                             3.22
     SO2  MASS (GRAMS)                             0.00

   HC   GRAMS/KILOMETRE      .24
   CO   GRAMS/KILOMETRE     3.23
   CO2  GRAMS/KILOMETRE    97.42
   NOX  GRAMS/KILOMETRE      .19
   SO2  GRAMS/KILOMETRE     0.00

   HC   GRAMS/KG OF FUEL   7.35     HC   GRAMS/MIN    .31
   CO   GRAMS/KG OF FUEL   99.1     CO   GRAMS/MIN    4.2
   CO2  GRAMS/KG OF FUEL   2990     CO2  GRAMS/MIN    127
   NOX  GRAMS/KG OF FUEL   5.96     NOX  GRAMS/MIN    .25
   SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
   CARBON BALANCE FUEL ECONOMY                     22.55  KILOMETRES/LITRE
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                    TABLE                         VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  900       TEST NO. 1          DATE  6/ 2/77                        MFGR. CODE    -0                      YR.  1976
VEHICLE MODEL  GL1000 CAT + AIR         ENGINE   1.02 LITRE 4                CURB WT.       0 KG                   GVM      0 KG

BAROMETER 740.16 MM OF HG.                                                   WET BULB TEMP  18.3 DEG. C
DRY BULB TEMP.    23.9 DEG. C                                                ABS. HUMIDITY  11.1 GRAMS/KG
REL. HUMIDITY      59 PCT.                                                   DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                             BLOWER INLET PRESS., G1 *73.2 MM. H2O
    BLOWER DIF. PRESS., G2, *51.0 MM. H2O                                    BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                     1               2               3
    BLOWER REVOLUTIONS                        10416           17783           10398
    ROLL COUNTS                                3577            3893            3581
    HC   SAMPLE  METER READING/SCALE          15.7/3          35.6/2          46.8/2
    HC   SAMPLE  PPM                           157              36              47
    HC   BACKGRD METER READING/SCALE           2.8/3           2.4/3          14.9/2
    HC   BACKGRD PPM                            28              24              15
    CO   SAMPLE  METER READING/SCALE          62.9/*          89.1/*          81.1/*
    CO   SAMPLE  PPM                           256              89             190
    CO   BACKGRD METER READING/SCALE           2.1/*           2.4/*           6.6/*
    CO   BACKGRD PPM                             6               7               6
    CO2  SAMPLE  METER READING/SCALE          43.8/3          32.3/3          37.9/3
    CO2  SAMPLE  PERCENT                       .75             .54             .64
    CO2  BACKGRD METER READING/SCALE           3.5/3           3.8/3           2.6/3
    CO2  BACKGRD PERCENT                       .05             .06             .04
    NOX  SAMPLE  METER READING/SCALE          19.3/2           7.1/2           9.6/2
    NOX  SAMPLE  PPM                          19.3             7.1             9.6
    NOX  BACKGRD METER READING/SCALE           .5/2            .5/2            .4/2
    NOX  BACKGRD PPM                            .5              .5              .4
    SO2  SAMPLE  METER READING/SCALE          -0.0/*          -0.0/*          -0.0/*
    SO2  SAMPLE  PPM                           0.0             0.0             0.0
    SO2  BACKGRD METER READING/SCALE          -0.0/*          -0.0/*          -0.0/*
    SO2  BACKGRD PPM                           0.0             0.0             0.0

    HC   CONCENTRATION PPM                     131              13              33
    CO   CONCENTRATION PPM                     241              80             178
    CO2  CONCENTRATION PCT                     .70             .48             .60
    NOX  CONCENTRATION PPM                    18.8             6.6             9.2
    SO2  CONCENTRATION PPM                     0.0             0.0             0.0
    HC   MASS GRAMS                           4.86             .80            1.21
    CO   MASS GRAMS                          18.13           10.27           13.34
    CO2  MASS GRAMS                         828.92          974.70          712.39
    NOX  MASS GRAMS                           2.36            1.41            1.15
    SO2  MASS GRAMS                           0.00            0.00            0.00
    TOTAL CARBON GRAMS                      238.22          271.11          201.22

    WEIGHTED MASS HC        .29 GRAMS/KILOMETRE
    WEIGHTED MASS CO       2.07 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    139.86 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .25 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        12.42 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  16.3  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              710.54 GRAMS
    ESTIMATED FUEL WEIGHT =    .82KG.
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        TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 900

DATE  6/ 2/77                 TIME     -0 HRS.          TEST NO.  1
MODEL  1976 HONDA GL1000 FET CAT + AIR                  ENGINE 1.0 LITRE  4
DRIVER   KN                   TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  21 C           DRY BULB TEMP  26 C       REL. HUM.  67.4 PCT
SPFC. HUM.  14.2 GRAM/KG      BARO.  740.4 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.78 MINUTES
  BLOWER INLET PRESS. 1473.2  MM. H2O
  BLOWER DIF.  PRESS. 1638.3  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10057
  DISTANCE TRAVELED    16.72  KILOMETRES
  BLOWER REVOLUTIONS     15733
  BLOWER CU. CM /REV.  8054

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE            52.5/2
   HC  SAMPLE  PPM                                53
   HC  BACKGRD METER READING/SCALE            13.0/2
   HC  BACKGRD PPM                                13
   CO  SAMPLE  METER READING/SCALE            67.0/*
   CO  SAMPLE  PPM                               151
   CO  BACKGRD METER READING/SCALE             1.9/*
   CO  BACKGRD PPM                                 3
   CO2 SAMPLE  METER READING/SCALE            54.7/3
   CO2 SAMPLE  PERCENT                           .96
   CO2 BACKGRD METER READING/SCALE             4.1/3
   CO2 BACKGRD PERCENT                           .06
   NOX SAMPLE  METER READING/SCALE            30.1/2
   NOX SAMPLE  PPM                            30.1
   NOX BACKGRD METER READING/SCALE              .6/2
   NOX BACKGRD PPM                                .6
   HC  CONCENTRATION PPM                         40
   CO  CONCENTRATION PPM                        142
   CO2 CONCENTRATION PCT                        .90
   NOX CONCENTRATION PPM                       29.5
   SO2 COCENTRATION PPM                        0.0
   HC  MASS (GRAMS)                            2.28
   CO  MASS (GRAMS)                           16.10
   CO2 MASS (GRAMS)                         1615.72
   NOX MASS (GRAMS)                            6.23
   SO2 MASS (GRAMS)                            0.00

HC  GRAMS/KILOMETRE      .14
CO  GRAMS/KILOMETRE      .96
CO2 GRAMS/KILOMETRE    96.65
NOX GRAMS/KILOMETRE      .37
SO2 GRAMS/KILOMETRE     0.00

HC  GRAMS/KG OF FUEL   4.38     HC  GRAMS/MIN     .18
CO  GRAMS/KG OF FUEL   31.0     CO  GRAMS/MIN     1.3
CO2 GRAMS/KG OF FUEL   3107     CO2 GRAMS/MIN     126
NOX GRAMS/KG OF FUEL  11.98     NOX GRAMS/MIN     .49
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                     23.61  KILOMETRES/LITRE
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                  TABLE                      VEHICLE EMISSION RESULTS
                                      1975  LIGHT DUTY EMISSIONS TEST
                                                                  MFGR. CODE    -0                    YR.  1976
UNIT NO.  900        TEST NO. 2         DATE  6/ 3/77               CURB WT.       0 KG                GVM       0 KG
VEHICLE MODEL  GL1000 CAT + AIR         ENGINE    1.02 LITRE 4

                                                                  WET BULB TEMP   19.4 DEG. C
BAROMETER 741.43 MM OF HG.                                        ABS. HUMIDITY   11.8 GRAMS/KG
DRY BULB TEMP.    25.6 DEG. C                                     DYNO ROLL CONSTANT    967.97
REL. HUMIDITY      57 PCT.

EXHAUST EMISSIONS                                                 BLOWER INLET PRESS., G1 *73.2 MM. H2O
                                                                  BLOWER INLET TEMP.    43 DEG. C
    BLOWER DIF. PRESS., G2, *38.3 MM. H2O
    BAG RESULTS
    BAG NO.                                        1              2              3
    BLOWER REVOLUTIONS                         10426          17918          10386
    ROLL COUNTS                                 3577           3891           3590
    HC   SAMPLE  METER READING/SCALE          16.1/3         35.6/2         45.9/2
    HC   SAMPLE  PPM                            161             36             46
    HC   BACKGRD METER READING/SCALE           1.4/3          1.5/3         11.8/2
    HC   BACKGRD PPM                             14             15             12
    CO   SAMPLE  METER READING/SCALE          91.5/*         87.0/*         93.3/*
    CO   SAMPLE  PPM                            223             87            229
    CO   BACKGRD METER READING/SCALE           2.2/*          2.3/*          4.1/*
    CO   BACKGRD PPM                              4              4              4
    CO2  SAMPLE  METER READING/SCALE          42.8/3         32.6/3         39.3/3
    CO2  SAMPLE  PERCENT                        .73            .54            .66
    CO2  BACKGRD METER READING/SCALE           3.2/3          3.1/3          3.3/3
    CO2  BACKGRD PERCENT                        .05            .05            .05
    NOX  SAMPLE  METER READING/SCALE          19.1/2          6.9/2          9.8/2
    NOX  SAMPLE  PPM                           19.1            6.9            9.8
    NOX  BACKGRD METER READING/SCALE            .4/2           .4/2           .2/2
    NOX  BACKGRD PPM                             .4             .4             .2
    SO2  SAMPLE  METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                            0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                            0.0            0.0            0.0

    HC   CONCENTRATION PPM                      148             21             35
    CO   CONCENTRATION PPM                      212             81            219
    CO2  CONCENTRATION PCT                      .68            .50            .62
    NOX  CONCENTRATION PPM                     18.7            6.5            9.6
    SO2  CONCENTRATION PPM                      0.0            0.0            0.0
    HC   MASS GRAMS                            5.52           1.36           1.29
    CO   MASS GRAMS                           16.03          10.46          16.44
    CO2  MASS GRAMS                          815.03        1017.55         732.26
    NOX  MASS GRAMS                            2.41           1.44           1.23
    SO2  MASS GRAMS                            0.00           0.00           0.00
    TOTAL CARBON GRAMS                       234.09         283.37         208.02

    WEIGHTED MASS HC         .36 GRAMS/KILOMETRE
    WEIGHTED MASS CO        2.15 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     143.68 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        .26 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        12.43 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  15.8  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST               725.48 GRAMS
    ESTIMATED FUEL WEIGHT =    .84KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 900

DATE  6/ 3/77                 TIME     -0 HRS.        TEST NO.  2
MODEL  1976 HONDA GL1000 FET CAT + AIR                ENGINE 1.0 LITRE  4
DRIVER   KN                   TEST WT.      0 KG.     GVW     0 KG
WET BULB TEMP  21 C           DRY BULB TEMP  26 C     REL. HUM.  64.1 PCT
SPEC. HUM.  14.0 GRAM/KG      BARO.  740.2 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS. 1473.2  MM. H2O
  BLOWER DIF.  PRESS. 1651.0  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10026
  DISTANCE TRAVELED    16.67  KILOMETRES
  BLOWER REVOLUTIONS    15713
  BLOWER CU. CM /REV.  8048

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE               43.2/2
   HC   SAMPLE  PPM                                 43
   HC   BACKGRD METER READING/SCALE               11.0/2
   HC   BACKGRD PPM                                 11
   CO   SAMPLE  METER READING/SCALE               76.9/4
   CO   SAMPLE  PPM                                178
   CO   BACKGRD METER READING/SCALE                1.5/4
   CO   BACKGRD PPM                                  3
   CO2 SAMPLE  METER READING/SCALE               54.7/3
   CO2 SAMPLE  PERCENT                             .96
   CO2 BACKGRD METER READING/SCALE                3.6/3
   CO2 BACKGRD PERCENT                             .06
   NOX SAMPLE  METER READING/SCALE               27.1/2
   NOX SAMPLE  PPM                               27.1
   NOX BACKGRD METER READING/SCALE                 .7/2
   NOX BACKGRD PPM                                  .7
   HC  CONCENTRATION PPM                            33
   CO  CONCENTRATION PPM                           169
   CO2 CONCENTRATION PCT                           .91
   NOX CONCENTRATION PPM                          26.5
   SO2 COCENTRATION PPM                            0.0
   HC  MASS (GRAMS)                               1.85
   CO  MASS (GRAMS)                              19.12
   CO2 MASS (GRAMS)                            1624.66
   NOX MASS (GRAMS)                               5.52
   SO2 MASS (GRAMS)                               0.00

 HC  GRAMS/KILOMETRE        .11
 CO  GRAMS/KILOMETRE       1.15
 CO2 GRAMS/KILOMETRE      97.49
 NOX GRAMS/KILOMETRE        .33
 SO2 GRAMS/KILOMETRE       0.00

 HC  GRAMS/KG OF FUEL   3.54      HC  GRAMS/MIN     .15
 CO  GRAMS/KG OF FUEL   36.5      CO  GRAMS/MIN     1.5
 CO2 GRAMS/KG OF FUEL   3101      CO2 GRAMS/MIN     127
 NOX GRAMS/KG OF FUEL  10.53      NOX GRAMS/MIN     .43
 SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                     23.37  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Yamaha RD-400

Date 1/28/77 Sequence Baseline with Yamaha Lube Oil and Stock Pipes, RDS-1

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1000	----	3.08	4.08	12.5	10.	78,400
20	2	3350	0.44	1.18	8.75	8.0	11.	58,400
30	3	3750	1.03	1.36	9.91	6.7	13.	40,800
40	4	4050	1.92	1.95	10.66	5.0	25.	34,400
50	5	4500	3.14	2.16	11.44	3.6	67.	23,800
60	6	5000	4.50	5.63	9.33	3.5	68.	31,200
Idle	N	1000	----	3.25	4.42	11.7	13.	87,800

Notes: Settings as set, after maladjustment phase, according to owners manual.
Maximum head temperature at 60 mph approximately 205°C.
Maximum gas temperature at 60 mph approximately 650°C.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE RD-400

Date 2/9/77 Sequence Catalyst No. 3001, no air, RDS-2

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1000	----	0.29	10.55	6.5	1.4	32,600
20	2	3400	0.40	0.76	12.96	2.2	8.	12,000
30	3	3800	1.00	0.29	13.36	2.1	23.	7,120
40	4	4050	1.90	0.73	13.62	1.7	8.	8,960
50	5	4500	3.06	0.67	13.36	2.2	70.	9,120
60	6	5000	4.43	1.46	13.32	1.4	100.	10,600
Idle	N	1000	----	0.24	10.96	5.5	1.4	25,000

Notes: Maximum temperature gas exit from catalyst approximately 500°C at 60 mph.
Maximum head temperature at 60 mph approximately 200°C.
Test conducted after LA-4 prep. run.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE RD-400

Date 2/10/77 Sequence Catalyst No. 3002, no air, RDS-3

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1050	----	0.87	12.02	4.7	2.	38,000
20	2	3400	0.46	1.36	14.86	1.0	7.	1,580
30	3	3700	1.07	0.65	14.66	1.0	6.	4,520
40	4	4100	1.92	1.00	15.20	0.6	9.	6,520
50	5	4500	2.97	0.35	15.34	0.6	55.	4,440
60	6	5000	4.29	3.35	14.13	0.4	-----	9,680
Idle	N	1050	----	1.46	12.02	4.7	1.	18,400

Notes: Backpressure measured at station No. 4 at 60 mph, 0.4 psi.
Maximum temperature gas exit from catalyst approximately 480°C at 60 mph.
Maximum temperature gas entrance to catalyst approximately 380°C at 60 mph.
Maximum head temperature at 60 mph approximately 195°C.
Test conducted after LA-4 prep. run.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Yamaha RD-400

Date 3/8/77 Sequence RDS-4

Condition				Concentrations					Enter Cat. °C	Exit Cat. °C	Exhaust Station #1 °C	Head °C
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C				
Idle	N	1300	-	0.35	12.02	3.9	4	1,140	145	220	180	80
20	2	3450	0.51	0.35	13.57	1.5	22	530	190	450	330	120
30	3	3700	1.13	0.01	13.69	1.9	44	280	200	430	360	135
40	4	4050	2.06	0.79	13.75	1.3	30.	520	220	415	420	145
50	5	4500	3.30	0.74	13.66	1.5	88	1,060	290	415	520	175
60	6	5000	4.70	4.07	12.38	0.4	5	5,700	380	480	580	210

Notes: Conducted with catalyst No. 3002 and air injection by Subaru reed valve (both reeds with approx. 20 inches of connection tubing

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Yamaha RD-400

Date 3/9/77 Sequence RDS-5

Conditon				Concentrations								
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Enter Cat. °C	Exit Cat. °C	Exhaust Station #1 °C	Head °C
Idle	N	1150	-	0.21	10.44	7.0	6	750	150	320	200	105
20	2	3400	0.52	0.28	13.58	2.7	24	680	185	440	330	120
30	3	3750	1.13	0.03	13.82	2.5	27	350	205	450	400	140
40	4	4100	2.02	0.46	14.66	1.1	1	620	230	450	440	150
50	5	4500	3.21	0.43	14.13	2.0	65	530	295	445	525	175
60	6	5000	4.62	4.44	12.74	0.7	4	6,050	375	475	590	215
Idle	N	1150	-	0.29	9.91	7.7	9	200	160	275	200	120

Notes: Conducted in the same state as RDS-4 but after catalyst casing had become red hot from cold start 505 operation with the choke on.

W.O.T. accel 0-100 kph ∿ 8.0 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Yamaha RD-400

Date 7/13/77 Sequence RDS-6 Thermal Reactors, no air

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1300	----	4.50	5.30	8.5	11.	93,100	no reaction indicated with air added
20	2	3300	0.47	3.08	9.45	5.3	11.	45,000	
30	3	3750	1.12	2.87	10.44	4.1	19.	17,700	
40	4	4000	2.03	3.18	10.99	3.2	37.	25,200	
50	5	4450	3.18	2.64	11.33	3.2	180.	24,400	
60		4900	4.51	4.97	9.28	3.9	110.	33,000	
Idle	N	1300	----	4.12	6.09	7.9	16.	84,800	

Notes: Thermal reactor (2nd design) inplace on each pipe - rise in back pressure reflecte by noticeable reduction in performance. Air addition showed no improvement of emissions.

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                      TABLE                                 VEHICLE EMISSION RESULTS
                                                     1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  500        TEST NO. 1          DATE 10/11/76                    MFGR. CODE   -0                     YR.  1976
VEHICLE MODEL  YAMAHA RD 400             ENGINE     .39 LITRE 2           CURR WT.      0 KG                  GVW      0 KG

BAROMETER 743.46 MM OF HG.                                                WET BULB TEMP  17.8 DEG. C
DRY BULB TEMP.    27.8 DEG. C                                             ABS. HUMIDITY   8.7 GRAMS/KG
REL. HUMIDITY      37 PCT.                                                DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS                                                         BLOWER INLET PRESS., G1 452.1 MM. H20
                                                                          BLOWER INLET TEMP.   43 DEG. C
     BLOWER DIF. PRESS., G2, 477.5 MM. H20
     BAG RESULTS
     BAG NO.                                      1             2             3
     BLOWER REVOLUTIONS                         6281          10769          6270
     ROLL COUNTS                                 3494          3729          3469
     HC   SAMPLE  METER READING/SCALE          24.9/4        15.9/4        18.7/4
     HC   SAMPLE  PPM                          2490          1590          1870
     HC   BACKGRD METER READING/SCALE           1.6/3         2.0/3         1.5/3
     HC   BACKGRD PPM                           16            20            15
     CO   SAMPLE  METER READING/SCALE          62.8/3        37.3/3        58.5/3
     CO   SAMPLE  PPM                          1597           893          1470
     CO   BACKGRD METER READING/SCALE           2.1/3          .6/3          .2/3
     CO   BACKGRD PPM                           45            13             4
     CO2  SAMPLE  METER READING/SCALE          31.8/3        21.5/3        29.0/3
     CO2  SAMPLE  PERCENT                       .53           .35           .48
     CO2  BACKGRD METER READING/SCALE           5.5/3         5.5/3         5.4/3
     CO2  BACKGRD PERCENT                       .08           .08           .08
     NOX  SAMPLE  METER READING/SCALE           3.1/2         2.0/2         3.4/2
     NOX  SAMPLE  PPM                           3.1           2.0           3.4
     NOX  BACKGRD METER READING/SCALE           1.6/2         1.1/2         1.2/2
     NOX  BACKGRD PPM                           1.6           1.1           1.2
     SO2  SAMPLE  METER READING/SCALE          -0.0/*        -0.0/*        -0.0/*
     SO2  SAMPLE  PPM                           0.0           0.0           0.0
     SO2  BACKGRD METER READING/SCALE          -0.0/*        -0.0/*        -0.0/*
     SO2  BACKGRD PPM                           0.0           0.0           0.0

     HC   CONCENTRATION PPM                    2475          1571          1856
     CO   CONCENTRATION PPM                    1520           864          1435
     CO2  CONCENTRATION PCT                     .45           .27           .40
     NOX  CONCENTRATION PPM                     1.6            .9           2.3
     SO2  CONCENTRATION PPM                     0.0           0.0           0.0
     HC   MASS GRAMS                           62.92         68.47         47.09
     CO   MASS GRAMS                           78.00         76.04         73.51
     CO2  MASS GRAMS                          363.89        369.88        323.35
     NOX  MASS GRAMS                            .13           .13           .18
     SO2  MASS GRAMS                           0.00          0.00          0.00
     TOTAL CARBON GRAMS                       187.22        192.82        160.53

     WEIGHTED MASS HC      10.21 GRAMS/KILOMETRE
     WEIGHTED MASS CO      12.64 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     59.29 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .02 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       11.99 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  21.1  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST               540.58 GRAMS
     ESTIMATED FUEL WEIGHT =   .62KG.
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    TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 500

DATE 10/11/76               TIME    -0 HRS.           TEST NO.  1
MODEL  1976 YAMAHA RD 400   FET                       ENGINE  .4 LITRE  2
DRIVER   JB                 TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  17 C         DRY BULB TEMP  28 C       REL. HUM.  33.8 PCT
SPEC. HUM.   8.0 GRAM/KG    BARO.  743.5 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.85 MINUTES
  BLOWER INLET PRESS.   457.2  MM. H2O
  BLOWER DIF.  PRESS.   482.6  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10037
  DISTANCE TRAVELED    16.68  KILOMETRES
  BLOWER REVOLUTIONS      9542
  BLOWER CU. CM /REV.  8098

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE               21.5/4
   HC   SAMPLE  PPM                               2150
   HC   BACKGRD METER READING/SCALE                1.0/3
   HC   BACKGRD PPM                                 10
   CO   SAMPLE  METER READING/SCALE               92.3/3
   CO   SAMPLE  PPM                               2681
   CO   BACKGRD METER READING/SCALE                 .3/3
   CO   BACKGRD PPM                                  6
   CO2  SAMPLE  METER READING/SCALE               46.7/3
   CO2  SAMPLE  PERCENT                             .80
   CO2  BACKGRD METER READING/SCALE                4.3/3
   CO2  BACKGRD PERCENT                             .07
   NOX  SAMPLE  METER READING/SCALE                5.6/2
   NOX  SAMPLE  PPM                                5.6
   NOX  BACKGRD METER READING/SCALE                1.1/2
   NOX  BACKGRD PPM                                1.1
   HC   CONCENTRATION PPM                         2141
   CO   CONCENTRATION PPM                         2604
   CO2  CONCENTRATION PCT                          .74
   NOX  CONCENTRATION PPM                          4.6
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                             82.54
   CO   MASS (GRAMS)                            202.71
   CO2  MASS (GRAMS)                            914.77
   NOX  MASS (GRAMS)                               .54
   SO2  MASS (GRAMS)                              0.00

HC   GRAMS/KILOMETRE     4.95
CO   GRAMS/KILOMETRE    12.15
CO2  GRAMS/KILOMETRE    54.83
NOX  GRAMS/KILOMETRE      .03
SO2  GRAMS/KILOMETRE     0.00

HC   GRAMS/KG OF FUEL  45.00      HC   GRAMS/MIN    6.43
CO   GRAMS/KG OF FUEL  429.8      CO   GRAMS/MIN   15.8
CO2  GRAMS/KG OF FUEL   1939      CO2  GRAMS/MIN     71
NOX  GRAMS/KG OF FUEL   1.15      NOX  GRAMS/MIN    .04
SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                       25.99  KILOMETRES/LITRE
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                       TABLE               VEHICLE EMISSION RESULTS
                                      1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  500        TEST NO. 2      DATE 10/13/76                     MFGR. CODE   -0                    YR.  1976
VEHICLE MODEL  YAMAHA RD400          ENGINE     .39 LITRE 2            CURB WT.      0 KG                 GVM      0 KG

BAROMETER 743.97 MM OF HG.                                             WET BULB TEMP  24.4 DEG. C
DRY BULB TEMP.    29.4 DEG. C                                          ABS. HUMIDITY  17.6 GRAMS/KG
REL. HUMIDITY     66 PCT.                                              DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                       BLOWER INLET PRESS., G1 957.2 MM, H2O
    BLOWER DIF. PRESS., G2, 492.6 MM, H2O                              BLOWER INLET TEMP.   43 DEG. C
    BAG RESULTS
    BAG NO.                                     1              2              3
    BLOWER REVOLUTIONS                       6296          10784           6282
    ROLL COUNTS                              3466           3704           3471
    HC    SAMPLE  METER READING/SCALE      26.6/4         16.2/4         18.1/4
    HC    SAMPLE  PPM                        2660           1620           1810
    HC    BACKGRD METER READING/SCALE       2.5/3          2.8/3          2.2/3
    HC    BACKGRD PPM                          25             28             22
    CO    SAMPLE  METER READING/SCALE      63.8/3         37.1/3         56.6/3
    CO    SAMPLE  PPM                        1627            888           1415
    CO    BACKGRD METER READING/SCALE        .3/3           .3/3           .2/3
    CO    BACKGRD PPM                           6              6              4
    CO2   SAMPLE  METER READING/SCALE      29.4/3         19.2/3         26.6/3
    CO2   SAMPLE  PERCENT                     .48            .31            .44
    CO2   BACKGRD METER READING/SCALE       3.4/3          3.6/3          4.0/3
    CO2   BACKGRD PERCENT                     .05            .06            .06
    NOX   SAMPLE  METER READING/SCALE       2.8/2          1.7/2          2.8/2
    NOX   SAMPLE  PPM                         2.8            1.7            2.8
    NOX   BACKGRD METER READING/SCALE       1.3/2           .9/2          1.1/2
    NOX   BACKGRD PPM                         1.3             .9            1.1
    SO2   SAMPLE  METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
    SO2   SAMPLE  PPM                         0.0            0.0            0.0
    SO2   BACKGRD METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
    SO2   BACKGRD PPM                         0.0            0.0            0.0

    HC    CONCENTRATION PPM                  2637           1593           1789
    CO    CONCENTRATION PPM                  1571            857           1369
    CO2   CONCENTRATION PCT                   .44            .26            .38
    NOX   CONCENTRATION PPM                   1.6             .8            1.8
    SO2   CONCENTRATION PPM                   0.0            0.0            0.0
    HC    MASS GRAMS                        67.19          69.49          45.46
    CO    MASS GRAMS                        80.76          75.50          70.23
    CO2   MASS GRAMS                       354.33         354.89         305.92
    NOX   MASS GRAMS                          .17            .16            .19
    SO2   MASS GRAMS                         0.00           0.00           0.00
    TOTAL CARBON GRAMS                     189.45         189.38         152.96

    WEIGHTED MASS HC      10.42 GRAMS/KILOMETRE
    WEIGHTED MASS CO      12.60 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     57.17 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .03 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.93 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  21.4  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST             531.79 GRAMS
    ESTIMATED FUEL WEIGHT =   .61KG.
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     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 500

DATE 10/13/76                 TIME     -0 HRS.          TEST NO.  2
MODEL  1976 YAMAHA RD400      FET                       ENGINE  .4 LITRE  2
DRIVER   TJ                   TEST WT.        0 KG.     GVW     0 KG
WET BULB TEMP  26 C           DRY BULB TEMP  29 C       REL. HUM.  76.6 PCT
SPEC. HUM.  19.7 GRAM/KG      BARO.  744.0 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.77 MINUTES
  BLOWER INLET PRESS.   457.2  MM. H2O
  BLOWER DIF.  PRESS.   482.6  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS     10267
  DISTANCE TRAVELED    17.07  KILOMETRES
  BLOWER REVOLUTIONS       9499
  BLOWER CU. CM /REV.  8100

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE              20.7/4
   HC  SAMPLE  PPM                              2070
   HC  BACKGRD METER READING/SCALE               1.4/3
   HC  BACKGRD PPM                                14
   CO  SAMPLE  METER READING/SCALE              79.1/3
   CO  SAMPLE  PPM                              2133
   CO  BACKGRD METER READING/SCALE                .1/3
   CO  BACKGRD PPM                                 2
   CO2 SAMPLE  METER READING/SCALE              46.9/3
   CO2 SAMPLE  PERCENT                            .81
   CO2 BACKGRD METER READING/SCALE               3.5/3
   CO2 BACKGRD PERCENT                            .05
   NOX SAMPLE  METER READING/SCALE               5.9/2
   NOX SAMPLE  PPM                               5.9
   NOX BACKGRD METER READING/SCALE               1.0/2
   NOX BACKGRD PPM                               1.0
   HC  CONCENTRATION PPM                        2057
   CO  CONCENTRATION PPM                        2046
   CO2 CONCENTRATION PCT                         .76
   NOX CONCENTRATION PPM                         5.0
   SO2 COCENTRATION PPM                         0.0
   HC  MASS (GRAMS)                            78.99
   CO  MASS (GRAMS)                           158.57
   CO2 MASS (GRAMS)                           929.16
   NOX MASS (GRAMS)                              .90
   SO2 MASS (GRAMS)                             0.00

 HC  GRAMS/KILOMETRE      4.63
 CO  GRAMS/KILOMETRE      9.29
 CO2 GRAMS/KILOMETRE     54.44
 NOX GRAMS/KILOMETPE       .05
 SO2 GRAMS/KILOMETRE      0.00

 HC  GRAMS/KG OF FUEL  45.24     HC  GRAMS/MIN   6.18
 CO  GRAMS/KG OF FUEL  351.8     CO  GRAMS/MIN   12.4
 CO2 GRAMS/KG OF FUEL   2061     CO2 GRAMS/MIN     73
 NOX GRAMS/KG OF FUEL   2.00     NOX GRAMS/MIN    .07
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
 CARRON BALANCE FUEL ECONOMY                    27.81  KILOMETRES/LITRE
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                          TABLE                         VEHICLE EMISSION RESULTS
                                          1975  LIGHT DUTY EMISSIONS TEST
                                      DATE  3/17/77                  MFGR. CODE    -0                    YR.  1976
UNIT NO.  500        TEST NO. /                                      CURB WT.      0 KG                  GVM      0 KG
VEHICLE MODEL  RD-400 2ND STEP, CAT+AIR   ENGINE    .41 LITRE 2
                                                                    WET BULB TEMP  20.0 DEG. C
BAROMETER 736.35 MM OF HG.                                          ABS. HUMIDITY  14.2 GRAMS/KG
DRY BULB TEMP.   22.2 DEG. C                                        DYNO ROLL CONSTANT   967.97
REL. HUMIDITY     82 PCT.

EXHAUST EMISSIONS                                                   BLOWER INLET PRESS., G1 457.2 MM. H2O
                                                                    BLOWER INLET TEMP.   43 DEG. C
   BLOWER DIF. PRESS., G2, 485.1 MM. H2O
   BAG RESULTS                                                                    3
   BAG NO.                                     1                2                6272
   BLOWER REVOLUTIONS                        6279             10759              3496
   ROLL COUNTS                               3493              3758              89.3/2
   HC   SAMPLE  METER READING/SCALE          11.3/4           48.9/2              89
   HC   SAMPLE  PPM                          1130              49                14.7/2
   HC   BACKGRD METER READING/SCALE           .1/4             1.5/3              15
   HC   BACKGRD PPM                           10               15                82.4/*
   CO   SAMPLE  METER READING/SCALE          26.5/3           51.5/*              381
   CO   SAMPLE  PPM                          619               196                 .5/*
   CO   BACKGRD METER READING/SCALE           .3/3              .3/3               1
   CO   BACKGRD PPM                            6                6                41.3/3
   CO2  SAMPLE  METER READING/SCALE          37.8/3           31.4/3              .70
   CO2  SAMPLE  PERCENT                       .64              .52               3.8/3
   CO2  BACKGRD METER READING/SCALE          3.5/3            3.3/3               .06
   CO2  BACKGRD PERCENT                       .05              .05               1.4/2
   NOX  SAMPLE  METER READING/SCALE          1.5/2             .9/2              1.4
   NOX  SAMPLE  PPM                          1.5               .9                 .5/2
   NOX  BACKGRD METER READING/SCALE           .6/2             .5/2               .5
   NOX  BACKGRD PPM                           .6               .5               -0.0/*
   SO2  SAMPLE  METER READING/SCALE         -0.0/*           -0.0/*              0.0
   SO2  SAMPLE  PPM                          0.0               0.0              -0.0/*
   SO2  BACKGRD METER READING/SCALE         -0.0/*           -0.0/*              0.0
   SO2  BACKGRD PPM                          0.0               0.0
                                                               35                 75
   HC   CONCENTRATION PPM                    1121              183                365
   CO   CONCENTRATION PPM                    589               .47                .65
   CO2  CONCENTRATION PCT                    .59                .4                 .9
   NOX  CONCENTRATION PPM                     .9               0.0                0.0
   SO2  CONCENTRATION PPM                    0.0               1.48               1.89
   HC   MASS GRAMS                          28.10             15.88              18.44
   CO   MASS GRAMS                          29.82            646.96             516.72
   CO2  MASS GRAMS                         469.05               .07                .09
   NOX  MASS GRAMS                            .09              0.00               0.00
   SO2  MASS GRAMS                           0.00            184.66             150.56
   TOTAL CARBON GRAMS                      165.12

   WEIGHTED MASS HC       1.21 GRAMS/KILOMETRE
   WEIGHTED MASS CO       3.25 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     44.82 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .01 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE       12.06 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  22.6  KILOMETRE/LITRE
   TOTAL CARBUN EXHAUST               500.35 GRAMS
   ESTIMATED FUEL WEIGHT =   .58KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 500

DATE  3/17/77                TIME     -0 HRS.          TEST NO.  1
MODEL  1976 HD-400 2ND STEP FET CAT302+SUB             ENGINE  .4 LITRE  2
DRIVER   KN                  TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  19 C          DRY BULB TEMP  27 C       REL. HUM.  50.9 PCT
SPEC. HUM.  11.4 GRAM/KG     BARO.  738.6 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION          12.76 MINUTES
  BLOWER INLET PRESS.  457.2  MM. H20
  BLOWER DIF.  PRESS.  482.6  MM  H20
  BLOWER INLET TEMP.     43  DEG. C
  DYNO REVOLUTIONS      9973
  DISTANCE TRAVELED   16.58  KILOMETRES
  BLOWER REVOLUTIONS     9478
  BLOWER CU. CM /REV.  8092

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              20.1/3
   HC   SAMPLE  PPM                               201
   HC   BACKGRD METER READING/SCALE               1.5/3
   HC   BACKGRD PPM                                15
   CO   SAMPLE  METER READING/SCALE              43.9/3
   CO   SAMPLE  PPM                              1066
   CO   BACKGRD METER READING/SCALE                .1/3
   CO   BACKGRD PPM                                 2
   CO2  SAMPLE  METER READING/SCALE              62.6/3
   CO2  SAMPLE  PERCENT                          1.11
   CO2  BACKGRD METER READING/SCALE               3.5/3
   CO2  BACKGRD PERCENT                           .05
   NOX  SAMPLE  METER READING/SCALE               2.9/2
   NOX  SAMPLE  PPM                               2.9
   NOX  BACKGRD METER READING/SCALE                .5/2
   NOX  BACKGRD PPM                                .5
   HC   CONCENTRATION PPM                         187
   CO   CONCENTRATION PPM                        1024
   CO2  CONCENTRATION PCT                        1.07
   NOX  CONCENTRATION PPM                         2.4
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                             7.12
   CO   MASS (GRAMS)                            78.55
   CO2  MASS (GRAMS)                          1292.02
   NOX  MASS (GRAMS)                              .32
   SO2  MASS (GRAMS)                             0.00

 HC   GRAMS/KILOMETRE       .43
 CO   GRAMS/KILOMETRE      4.74
 CO2  GRAMS/KILOMETRE     77.94
 NOX  GRAMS/KILOMETRE       .02
 SO2  GRAMS/KILOMETRE      0.00

 HC   GRAMS/KG OF FUEL  15.70     HC   GRAMS/MIN     .56
 CO   GRAMS/KG OF FUEL  173.1     CO   GRAMS/MIN     6.2
 CO2  GRAMS/KG OF FUEL   2848     CO2  GRAMS/MIN     101
 NOX  GRAMS/KG OF FUEL    .70     NOX  GRAMS/MIN     .02
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                  26.84  KILOMETRES/LITRE
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                    TABLE                         VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  500         TEST NO. 2         DATE  3/11/77                         MFGR. CODE    -0                 YR.  1976
VEHICLE MODEL  RD-400  2ND STEP, CAT+AIR  FNGINE     .41 LITRE 2               CUMB WT.      0 KG               GVM      0 KG

BAROMETER 734.06 MM OF HG.                                                     WET BULB TEMP  12.8 DEG. C
DRY BULB TEMP.    21.1 DEG. C                                                  ABS. HUMIDITY   6.0 GRAMS/KG
REL. HUMIDITY       37 PCT.                                                    DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                               BLOWER INLET PRESS., G1 452.1 MM. H2O
     BLOWER DIF. PRESS., G2, 482.6 MM. H2O                                     BLOWER INLET TEMP.    43 DEG. C
     BAG RESULTS
     BAG NO.                                     1                 2                 3
     BLOWER REVOLUTIONS                       6335             10756              6278
     ROLL COUNTS                               3440              3711              3449
     HC   SAMPLE  METER READING/SCALE         9.9/4             41.7/2            52.3/2
     HC   SAMPLE  PPM                         990                42                52
     HC   BACKGRD METER READING/SCALE         1.2/3             9.0/2             7.8/2
     HC   BACKGRD PPM                          12                 9                 8
     CO   SAMPLE  METER READING/SCALE        79.8/*            45.9/*            62.2/*
     CO   SAMPLE  PPM                         362               170               252
     CO   BACKGRD METER READING/SCALE         .6/*              .5/*              .2/*
     CO   BACKGRD PPM                           2                 1                 1
     CO2  SAMPLE  METER READING/SCALE        36.8/3            30.3/3            39.8/3
     CO2  SAMPLE  PERCENT                     .62               .50               .67
     CO2  BACKGRD METER READING/SCALE         3.5/3             3.5/3             3.2/3
     CO2  BACKGRD PERCENT                     .05               .05               .05
     NOX  SAMPLE  METER READING/SCALE         2.9/2             1.4/2             1.9/2
     NOX  SAMPLE  PPM                         2.9               1.4               1.9
     NOX  BACKGRD METER READING/SCALE         1.0/2             .8/2              .7/2
     NOX  BACKGRD PPM                         1.0                .8                .7
     SO2  SAMPLE  METER READING/SCALE        -0.0/*            -0.0/*            -0.0/*
     SO2  SAMPLE  PPM                         0.0               0.0               0.0
     SO2  BACKGRD METER READING/SCALE        -0.0/*            -0.0/*            -0.0/*
     SO2  BACKGRD PPM                         0.0               0.0               0.0

     HC   CONCENTRATION PPM                   979                33                45
     CO   CONCENTRATION PPM                   352               165               245
     CO2  CONCENTRATION PCT                   .57               .45               .63
     NOX  CONCENTRATION PPM                   2.0                .6               1.2
     SO2  CONCENTRATION PPM                   0.0               0.0               0.0
     HC   MASS GRAMS                        24.71              1.42              1.12
     CO   MASS GRAMS                        17.93             14.24             12.37
     CO2  MASS GRAMS                       457.23            614.09            500.65
     NOX  MASS GRAMS                          .14               .08               .09
     SO2  MASS GRAMS                         0.00              0.00              0.00
     TOTAL CARBON GRAMS                    153.86            174.93            142.91

     WEIGHTED MASS HC        1.07 GRAMS/KILOMETRE
     WEIGHTED MASS CO        2.44 GRAMS/KILOMETRE
     WEIGHTED MASS CO2      92.14 GRAMS/KILOMETRE
     WEIGHTED MASS NOX        .02 GRAMS/KILOMETRE
     WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE        11.90 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  23.6  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST             471.71 GRAMS
     ESTIMATED FUEL WEIGHT =    .54KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 500

 DATE  3/17/77                 TIME    -0 HRS.        TEST NO.  2
 MODEL  1976 RD-400 2ND STEP FET CAT302+SUB           ENGINE  .4 LITRE  2
 DRIVER   KN                   TEST WT.     0 KG.     GVW    0 KG
 WET BULB TEMP  20 C           DRY BULB TEMP  27 C    REL. HUM.  51.5 PCT
 SPEC. HUM.  12.0 GRAM/KG      BARO.  734.1 MM  HG.   MEASURED FUEL  0.00 KG

   RUN DURATION            12.76 MINUTES
   BLOWER INLET PRESS.   457.2  MM. H2O
   BLOWER DIF.  PRESS.   487.7  MM  H2O
   BLOWER INLET TEMP.      43  DEG. C
   DYNO REVOLUTIONS       9979
   DISTANCE TRAVELED   16.59  KILOMETRES
   BLOWER REVOLUTIONS      9469
   BLOWER CU. CM /REV.  8078

   BAG RESULTS
    HC   SAMPLE  METER READING/SCALE                 22.1/3
    HC   SAMPLE  PPM                                  221
    HC   BACKGRD METER READING/SCALE                  1.2/3
    HC   BACKGRD PPM                                   12
    CO   SAMPLE  METER READING/SCALE                 46.8/3
    CO   SAMPLE  PPM                                 1144
    CO   BACKGRD METER READING/SCALE                   .1/3
    CO   BACKGRD PPM                                    2
    CO2  SAMPLE  METER READING/SCALE                 65.5/3
    CO2  SAMPLE  PERCENT                              1.17
    CO2  BACKGRD METER READING/SCALE                  4.5/3
    CO2  BACKGRD PERCENT                               .07
    NOX  SAMPLE  METER READING/SCALE                  3.0/2
    NOX  SAMPLE  PPM                                  3.0
    NOX  BACKGRD METER READING/SCALE                   .6/2
    NOX  BACKGRD PPM                                   .6
    HC   CONCENTRATION PPM                            210
    CO   CONCENTRATION PPM                           1097
    CO2  CONCENTRATION PCT                            1.11
    NOX  CONCENTRATION PPM                            2.5
    SO2  COCENTRATION PPM                             0.0
    HC   MASS (GRAMS)                                 7.92
    CO   MASS (GRAMS)                                83.43
    CO2  MASS (GRAMS)                              1334.11
    NOX  MASS (GRAMS)                                  .32
    SO2  MASS (GRAMS)                                 0.00

 HC   GRAMS/KILOMETRE        .48
 CO   GRAMS/KILOMETRE       5.03
 CO2  GRAMS/KILOMETRE      80.43
 NOX  GRAMS/KILOMETRE        .02
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  16.84      HC   GRAMS/MIN     .62
 CO   GRAMS/KG OF FUEL  177.4      CO   GRAMS/MIN     6.5
 CO2  GRAMS/KG OF FUEL   2837      CO2  GRAMS/MIN     105
 NOX  GRAMS/KG OF FUEL    .68      NOX  GRAMS/MIN     .03
 SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY
                                           25.91  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KH-500

Date 3/9/77 Sequence KHS-1 Stock Base

Condition				Concentrations					Avg. Exhaust gas temp @ station #1
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1600	-	2.46	3.43	13.8	9	69,600	205°C
20	2	3050	0.50	3.32	5.73	9.9	10	67,800	327
30	3	3600	1.14	3.48	6.67	8.5	10	62,400	395
40	4	4000	2.07	3.62	7.92	7.2	11	50,800	435
50	5	4350	3.30	5.38	7.64	6.0	15	49,600	485
60	5	5150	4.77	7.52	7.02	4.7	18	44,400	543
Idle	N	1800	-	2.60	3.30	12.7	11	73,000	223

Notes: Stock - as received

Max. head temp at 60 mph 160°C

Max. exhaust gas temp @ station #1 ∿ 550°C

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KH-500

Date 3/28-77 Sequence KHS-2 with port liners

Conditon				Concentrations					Avg. Exhaust gas temp @ station #1
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1500	-						215
20	2	3000	0.55						370
30	3	3600	1.21						432
40	4	4000	2.12						487
50	5	4400	3.38						540
60	5	5100	4.75						572
Idle	N	1650	-						237

Notes: Carburetors - as received

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KH-500

Date 4/18/77 Sequence KHS-3

Condition				Concentrations					Right Cat # 1		Middle Cat # 2		Left Cat # 3	
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Ent.	Exit	Ent.	Exit	Ent.	Exit
Idle	N	1500	----	3.93	10.81	3.4	1.9	18,100	290	290	280	475	240	380
20	2	3050	0.51	5.31	11.40	1.5	1.6	10,200	305	430	330	610	250	510
30	3	3500	1.20	4.85	11.79	1.1	1.8	8,480	295	440	325	630	255	560
40	4	4000	2.14	4.73	11.95	0.7	2.8	9,600	305	460	350	655	255	580
50	5	4300	3.38	5.40	11.70	0.5	7.0	4,500	350	505	380	700	300	580
60	5	5100	4.84	8.60	10.12	0.2	15.0	12,300	430	605	440	780	325	680
Idle	N	1750	----	4.44	9.54	3.2	1.6	9,280	330	375	325	550	250	455

Notes: carburetors: set as received
catalyst No. PTX 314, with 1" Torvex, mounted approx. 18" from exhaust port
port liners installed
WOT 0-100 kph = 9.3 sec.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KH-500

Date 5/11/77 Sequence KHS-4 Cat + Lean

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1500	----	1.85	10.60	5.3	1.5	12,400
20	2	3050	Interference From CDI	2.12	12.87	2.2	1.5	6,160
30	3	3600		1.71	13.33	1.9	1.8	3,960
40	4	4000		1.15	13.67	1.7	8.7	5,240
50	5	4350		0.53	14.26	1.3	105.	2,880
60	5	5200		0.05	14.53	1.4	870.	1,380
Idle	N	1750	----	2.46	10.77	5.0	2.8	18,400

Notes: Jet Needle Position changed from position #4 to #1, #1 is top position
Pilot Air Screw changed from 1-1/2 turns out ot 2-1/2 turns out
Vacuum alignment by dealer
Max. head temp. 240°C at 60 mph
Max. gas temp. exit from right port 550°C at 60 mph; right exhaust exit from cat. 575°C; middle exhaust exit from cat. 790°C; left cat. exit 675°C
WOT accel time 0 - 100 kph = 10.4 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KH-500

Date 6/16/77 Sequence KHS-5

Condition				Concentrations					Right Cat.#1		Middle Cat.#2		Left Cat.#3	
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	ΔP	Exit	ΔP	Exit	ΔP	Exit
Idle	N	1200	----	1.81	4.25	12.8	1.7	56,400	0	40	0	40	0	40
20	2	3050	----	3.53	8.54	6.8	5.7	51,100	0	110	0	90	0	355
30	3	3500	----	3.86	10.39	4.1	5.2	34,400	.2	440	.2	150	.4	500
40	4	4000	----	5.08	11.96	1.7	1.5	12,600	.2	540	.2	640	.6	540
50	5	4200	----	7.42	10.88	1.3	2.5	13,800	1	605	.4	655	1.0	570
60	5	5000	----	10.16	9.96	0.8	3.4	14,400	1.8	650	1.2	700	2.8	640
Idle	N	1400	----	1.27	4.30	12.8	2.5	7,360	-	375	---	470	---	375
									in. H_2O	°C	in H_2O	°C	in H_2O	°C

Notes: KHS-5 follows 300 mile road work and installation of new-catalyst PTX 314, 1 inc
Torvex + 3 inches hex NGK. Carburetors aligned, set as received. Port liners installed.
Max. head temp (center) 150°C, (right) 165°C at 60 mph.; Max. exhaust gas exit temp fro
port, 570°C (middle), 530°C (right) at 60 mph
ΔP = in. H_2O

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KH-500

Date 6/20/77 Sequence KHS-6

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1800	----	2.83	10.26	5.8	0.3	11,400
20	2	3000	----	3.30	11.89	2.3	0.9	9,760
30	3	3500	----	2.56	12.38	2.1	2.4	8,240
40	4	3800	----	1.90	13.04	1.9	7.5	9,200
50	5	4300	----	1.21	13.40	1.8	19.0	5,400
60	5	5200	----	1.00	14.00	1.3	190.	3,220
Idle	N	1900	----	2.54	10.77	5.2	1.4	10,900

Notes: Catalyst and port liners installed + carb. (left & right) #1 clip position,
2-1/2 airscrew, (middle) #2 clip position 2 airscrew
Max. head temp. (center) 180°C, (right) 180°C
Max. exhaust gas temp. 590°C at 60 mph
Max. exhaust gas temp. from catalyst, 675°C (right), 605 (left), 570 (middle) at 60 mph
W.O.T. accel. time 0 - 100 kph, 9.05 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KH-500

Date 6/25/77 Sequence KHS-7

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Air Injection by Pump No. 1533 at 1:1, cfm
Idle	N	1600	----	0.73	10.55	8.0	1.1	2,320	0.5
20	2	3000	----	0.49	12.92	3.6	9.	1,080	1.2
30	3	3500	----	0.39	13.03	3.1	26.	352	1.4
40	4	3900	----	0.33	13.30	2.7	38.	356	1.6
50	5	4300	----	0.06	13.75	2.2	85.	612	1.8
60	5	5000	----	0.03	13.87	2.0	355.	1,660	2.1
Idle	N	1700	----	0.77	10.55	8.0	0.7	1,480	0.5

Notes: Catalyst + Port liners + carb. lean + air pump (air injection probes not used)
Max. head temp. 175°C (middle), 185°C (right) at 60 mph
Max. exhaust gas temp. 515°C at 60 mph
Max. catalyst exit temp. 670°C at 60 mph

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                      TABLE                      VEHICLE EMISSION RESULTS
                                             1975  LIGHT DUTY EMISSIONS TEST
UNIT NO. 600        TEST NO. 1          DATE 10/12/76                        MFGR. CODE    -0                YR.  1976
VEHICLE MODEL  KAWASAKI  KH500          ENGINE    .51 LITRE 2                CURR WT.       0 KG             GVM      0 KG

BAROMETER 743.97 MM OF HG.                                                WET BULB TEMP  17.8 DEG. C
DRY BULB TEMP.   26.7 DEG. C                                              ABS. HUMIDITY   9.2 GRAMS/KG
REL. HUMIDITY     41 PCT.                                                 DYNO ROLL CONSTANT   967.47

EXHAUST EMISSIONS
                                                                          BLOWER INLET PRESS., G1 952.1 MM. H2O
     BLOWER DIF. PRESS., G2, 969.9 MM. H2O                                BLOWER INLET TEMP.    43 DEG. C
     BAG RESULTS
     BAG NO.                                      1               2                3
     BLOWER REVOLUTIONS                         6264            10759            6270
     ROLL COUNTS                                 3458            3723             3458
     HC    SAMPLE  METER READING/SCALE          37.2/4          30.6/4           37.0/4
     HC    SAMPLE  PPM                          3770            3060             3700
     HC    BACKGRD METER READING/SCALE           1.9/3           2.2/3            1.4/3
     HC    BACKGRD PPM                           19              22               14
     CO    SAMPLE  METER READING/SCALE          55.6/2          40.6/2           61.2/2
     CO    SAMPLE  PPM                          2785            1838             3190
     CO    BACKGRD METER READING/SCALE            .1/2            .1/2             .1/2
     CO    BACKGRD PPM                             4               4                4
     CO2   SAMPLE  METER READING/SCALE          30.3/3          18.5/3           26.5/3
     CO2   SAMPLE  PERCENT                       .50             .30              .43
     CO2   BACKGRD METER READING/SCALE           3.8/3           3.4/3            3.2/3
     CO2   BACKGRD PERCENT                       .06             .05              .05
     NOX   SAMPLE  METER READING/SCALE           2.4/2           1.8/2            2.4/2
     NOX   SAMPLE  PPM                           2.4             1.8              2.4
     NOX   BACKGRD METER READING/SCALE           1.3/2           1.1/2            1.1/2
     NOX   BACKGRD PPM                           1.3             1.1              1.1
     SO2   SAMPLE  METER READING/SCALE          -0.0/*          -0.0/*           -0.0/*
     SO2   SAMPLE  PPM                           0.0             0.0              0.0
     SO2   BACKGRD METER READING/SCALE          -0.0/*          -0.0/*           -0.0/*
     SO2   BACKGRD PPM                           0.0             0.0              0.0

     HC    CONCENTRATION PPM                    3753            3039             3687
     CO    CONCENTRATION PPM                    2718            1800             3118
     CO2   CONCENTRATION PCT                     .45             .25              .39
     NOX   CONCENTRATION PPM                     1.2             .8               1.4
     SO2   CONCENTRATION PPM                     0.0             0.0              0.0
     HC    MASS GRAMS                           95.36           132.66            93.78
     CO    MASS GRAMS                          139.45           158.59           160.11
     CO2   MASS GRAMS                          362.76           344.07           315.39
     NOX   MASS GRAMS                             .10             .11              .11
     SO2   MASS GRAMS                            0.00            0.00             0.00
     TOTAL CARBON GRAMS                        241.34           276.74           235.91

     WEIGHTED MASS HC      19.03 GRAMS/KILOMETRE
     WEIGHTED MASS CO      25.95 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     56.95 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .02 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE        11.94 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  14.9  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST                753.99 GRAMS
     ESTIMATED FUEL WEIGHT =   .82KG.
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    TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 600

DATE 10/12/76                TIME    -0 HRS.           TEST NO.  1
MODEL  1976 KAWASAKI KH500 HIWAY CYCLE                 ENGINE  .5 LITRE  3
DRIVER   JB                  TEST WT.        0 KG.     GVW    0 KG
WET BULB TEMP  16 C          DRY BULB TEMP  26 C       REL. HUM.  34.4 PCT
SPEC. HUM.    7.4 GRAM/KG    BARO.   743.2 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION            12.77 MINUTES
  BLOWER INLET PRESS.   457.2  MM. H20
  BLOWER DIF.  PRESS.   482.6  MM  H20
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS        9946
  DISTANCE TRAVELED     16.53  KILOMETRES
  BLOWER REVOLUTIONS       9499
  BLOWER CU. CM /REV.   8100

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                  43.2/4
   HC   SAMPLE  PPM                                  4320
   HC   BACKGRD METER READING/SCALE                   8.6/3
   HC   BACKGRD PPM                                    86
   CO   SAMPLE  METER READING/SCALE                  89.1/2
   CO   SAMPLE  PPM                                  5563
   CO   BACKGRD METER READING/SCALE                    .1/2
   CO   BACKGRD PPM                                     4
   CO2  SAMPLE  METER READING/SCALE                  42.5/3
   CO2  SAMPLE  PERCENT                                .72
   CO2  BACKGRD METER READING/SCALE                   3.2/3
   CO2  BACKGRD PERCENT                                .05
   NOX  SAMPLE  METER READING/SCALE                   3.4/2
   NOX  SAMPLE  PPM                                   3.4
   NOX  BACKGRD METER READING/SCALE                   1.8/2
   NOX  BACKGRD PPM                                   1.8
   HC   CONCENTRATION PPM                            4245
   CO   CONCENTRATION PPM                            5420
   CO2  CONCENTRATION PCT                             .68
   NOX  CONCENTRATION PPM                             2.3
   SO2  COCENTRATION PPM                             0.0
   HC   MASS (GRAMS)                               162.89
   CO   MASS (GRAMS)                               419.92
   CO2  MASS (GRAMS)                               834.04
   NOX  MASS (GRAMS)                                  .27
   SO2  MASS (GRAMS)                                 0.00

 HC  GRAMS/KILOMETRE      9.85
 CO  GRAMS/KILOMETRE     25.40
 CO2 GRAMS/KILOMETRE     50.45
 NOX GRAMS/KILOMETRE       .02
 SO2 GRAMS/KILOMETRE      0.00

 HC  GRAMS/KG OF FUEL  46.84      HC  GRAMS/MIN  12.75
 CO  GRAMS/KG OF FUEL  662.1      CO  GRAMS/MIN   32.9
 CO2 GRAMS/KG OF FUEL   1315      CO2 GRAMS/MIN     65
 NOX GRAMS/KG OF FUEL    .42      NOX GRAMS/MIN    .02
 SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                    19.15  KILOMETRES/LITRE
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                    TABLE                    VEHICLE EMISSION RESULTS
                                        1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  600        TEST NO. 2         DATE 10/13/76                    MFGR. CODE    -0                YR.  1976
VEHICLE MODEL  KAWASAKI KH 500          ENGINE     .51 LITRE 3           CURB WT.      0 KG              GVW      0 KG

BAROMETER 745.44 MM OF HG.                                               WET BULB TEMP  18.3 DEG. C
DRY BULB TEMP.   25.6 DEG. C                                             ABS. HUMIDITY  10.3 GRAMS/KG
REL. HUMIDITY      50 PCT.                                               DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                         BLOWER INLET PRESS., G1 457.2 MM. H2O
     BLOWER DIF. PRESS., G2, 482.6 MM. H2O                               BLOWER INLET TEMP.   43 DEG. C
     BAG RESULTS
     BAG NO.                                      1             2            3
     BLOWER REVOLUTIONS                        6256         10768         6261
     ROLL COUNTS                               3490          3734         3468
     HC   SAMPLE  METER REA INO/SCALE        45.5/4        30.6/4       36.5/4
     HC   SAMPLE  PPM                          4550          3060         3650
     HC   BACKGRD METER READING/SCALE         6.2/3         3.6/3        1.7/3
     HC   BACKGRD PPM                            62            36           17
     CO   SAMPLE  METER READING/SCALE        60.7/2        40.5/2       62.1/2
     CO   SAMPLE  PPM                          3153          1832         3258
     CO   BACKGRD METER READING/SCALE         0.0/2          .1/2         .1/2
     CO   BACKGRD PPM                             0             4            4
     CO2  SAMPLE  METER READING/SCALE        27.7/3        17.0/3       25.3/3
     CO2  SAMPLE  PERCENT                       .45           .27          .41
     CO2  BACKGRD METER READING/SCALE         2.4/3         2.1/3        2.3/3
     CO2  BACKGRD PERCENT                       .04           .03          .04
     NOX  SAMPLE  METER READING/SCALE         2.0/2         1.5/2        2.1/2
     NOX  SAMPLE  PPM                           2.0           1.5          2.1
     NOX  BACKGRD METER READING/SCALE          .7/2          .7/2         .4/2
     NOX  BACKGRD PPM                            .7            .7           .4
     SO2  SAMPLE  METER READING/SCALE        -0.0/*        -0.0/*       -0.0/*
     SO2  SAMPLE  PPM                           0.0           0.0          0.0
     SO2  BACKGRD METER READING/SCALE        -0.0/*        -0.0/*       -0.0/*
     SO2  BACKGRD PPM                           0.0           0.0          0.0

     HC   CONCENTRATION PPM                    4494          3026         3634
     CO   CONCENTRATION PPM                    3075          1790         3177
     CO2  CONCENTRATION PCT                     .42           .24          .38
     NOX  CONCENTRATION PPM                     1.4            .8          1.3
     SO2  CONCENTRATION PPM                     0.0           0.0          0.0
     HC   MASS GRAMS                         113.44        132.06        92.23
     CO   MASS GRAMS                         157.42        157.72       162.76
     CO2  MASS GRAMS                         340.84        335.17       307.95
     NOX  MASS GRAMS                            .11           .12          .11
     SO2  MASS GRAMS                           0.00          0.00         0.00
     TOTAL CARBON GRAMS                      254.15        273.42       233.68

     WEIGHTED MASS HC      19.44 GRAMS/KILOMETRE
     WEIGHTED MASS CO      26.54 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     54.83 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .02 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       11.44 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  14.4  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST            766.25 GRAMS
     ESTIMATED FUEL WEIGHT =   .89KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 600

DATE 10/13/76               TIME    -0 HRS.         TEST NO.  2
MODEL  1976 KAWASAKI KH 500HIWAY CYCLE              ENGINE  .5 LITRE  3
DRIVER   TJ                 TEST WT.      0 KG.     GVW    0 KG
WET BULB TEMP  19 C         DRY BULB TEMP  26 C     REL. HUM.  53.5 PCT
SPEC. HUM.  11.5 GRAM/KG    BARO.  746.0 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION          12.78 MINUTES
  BLOWER INLET PRESS.  457.2  MM. H2O
  BLOWER DIF.  PRESS.  482.6  MM  H2O
  BLOWER INLET TEMP.     43  DEG. C
  DYNO REVOLUTIONS     9922
  DISTANCE TRAVELED   16.49  KILOMETRES
  BLOWER REVOLUTIONS     9488
  BLOWER CU. CM /REV.  8101

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE             47.1/4
   HC  SAMPLE  PPM                             4710
   HC  BACKGRD METER READING/SCALE              1.3/3
   HC  BACKGRD PPM                               13
   CO  SAMPLE  METER READING/SCALE             93.9/2
   CO  SAMPLE  PPM                             5992
   CO  BACKGRD METER READING/SCALE               .4/2
   CO  BACKGRD PPM                               15
   CO2 SAMPLE  METER READING/SCALE             41.8/3
   CO2 SAMPLE  PERCENT                          .71
   CO2 BACKGRD METER READING/SCALE              3.1/3
   CO2 BACKGRD PERCENT                          .05
   NOX SAMPLE  METER READING/SCALE              3.4/2
   NOX SAMPLE  PPM                              3.4
   NOX BACKGRD METER READING/SCALE              1.5/2
   NOX BACKGRD PPM                              1.5
   HC  CONCENTRATION PPM                       4699
   CO  CONCENTRATION PPM                       5793
   CO2 CONCENTRATION PCT                        .67
   NOX CONCENTRATION PPM                        2.1
   SO2 COCENTRATION PPM                        0.0
   HC  MASS (GRAMS)                           180.83
   CO  MASS (GRAMS)                           450.15
   CO2 MASS (GRAMS)                           822.30
   NOX MASS (GRAMS)                              .27
   SO2 MASS (GRAMS)                             0.00

 HC  GRAMS/KILOMETRE     10.96
 CO  GRAMS/KILOMETRE     27.29
 CO2 GRAMS/KILOMETRE     49.86
 NOX GRAMS/KILOMETRE       .02
 SO2 GRAMS/KILOMETRE     0.00

 HC  GRAMS/KG OF FUEL  42.56      HC  GRAMS/MIN  14.15
 CO  GRAMS/KG OF FUEL  678.5      CO  GRAMS/MIN   35.2
 CO2 GRAMS/KG OF FUEL   1239      CO2 GRAMS/MIN     64
 NOX GRAMS/KG OF FUEL    .41      NOX GRAMS/MIN    .02
 SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                   18.26  KILOMETRES/LITRE
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                     TABLE                  VEHICLE EMISSION RESULTS
                                     1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  600       TEST NO. 1       DATE  4/21/77              MFGR. CODE   -0                  YR.  1976
VEHICLE MODEL  KH-500 1ST CAT+PORT LINERS  ENGINE    .51 LITRE 3    CURB WT.      0 KG            GVW      0 KG

BAROMETER 741.17 MM OF HG.                                     WET BULB TEMP  19.4 DEG. C
DRY BULB TEMP.    26.7 DEG. C                                  ABS. HUMIDITY  11.4 GRAMS/KG
REL. HUMIDITY     51 PCT.                                      DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                               BLOWER INLET PRESS., G1 457.2 MM. H2O
   BLOWER DIF. PRESS., G2, 482.6 MM. H2O                       BLOWER INLET TEMP.    43 DEG. C
   BAG RESULTS
   BAG NO.                                     1                 2                 3
   BLOWER REVOLUTIONS                        6281             10799              6279
   ROLL COUNTS                                3450              3773              3494
   HC   SAMPLE  METER READING/SCALE          16.8/4            39.8/3            85.9/3
   HC   SAMPLE  PPM                          1680               398               859
   HC   BACKGRD METER READING/SCALE            .2/4              .4/4             1.4/3
   HC   BACKGRD PPM                            20                40                14
   CO   SAMPLE  METER READING/SCALE          92.7/3            83.1/3            64.8/2
   CO   SAMPLE  PPM                          2700              2285              3466
   CO   BACKGRD METER READING/SCALE            .1/3              .5/3              .2/3
   CO   BACKGRD PPM                             2                11                 4
   CO2  SAMPLE  METER READING/SCALE          41.9/3            31.5/3            42.3/3
   CO2  SAMPLE  PERCENT                        .71               .52               .72
   CO2  BACKGRD METER READING/SCALE           3.6/3             3.4/3             2.5/3
   CO2  BACKGRD PERCENT                        .06               .05               .04
   NOX  SAMPLE  METER READING/SCALE           1.4/2              .5/2              .6/2
   NOX  SAMPLE  PPM                           1.4                .5                .6
   NOX  BACKGRD METER READING/SCALE            .5/2              .4/2              .3/2
   NOX  BACKGRD PPM                            .5                .4                .3
   SO2  SAMPLE  METER READING/SCALE          -0.0/*            -0.0/*            -0.0/*
   SO2  SAMPLE  PPM                           0.0               0.0               0.0
   SO2  BACKGRD METER READING/SCALE          -0.0/*            -0.0/*            -0.0/*
   SO2  BACKGRD PPM                           0.0               0.0               0.0

   HC   CONCENTRATION PPM                    1662               360               846
   CO   CONCENTRATION PPM                    2616              2215              3357
   CO2  CONCENTRATION PCT                     .66               .47               .69
   NOX  CONCENTRATION PPM                      .9                .1                .3
   SO2  CONCENTRATION PPM                     0.0               0.0               0.0
   HC   MASS GRAMS                          42.02             15.59             21.40
   CO   MASS GRAMS                         133.59            193.49            171.38
   CO2  MASS GRAMS                         534.38            653.26            552.87
   NOX  MASS GRAMS                            .08               .02               .03
   SO2  MASS GRAMS                           0.00              0.00              0.00
   TOTAL CARBON GRAMS                      239.50            274.75            242.90

   WEIGHTED MASS HC        3.81 GRAMS/KILOMETRE
   WEIGHTED MASS CO       28.94 GRAMS/KILOMETRE
   WEIGHTED MASS CO2      99.45 GRAMS/KILOMETRE
   WEIGHTED MASS NOX        .01 GRAMS/KILOMETRE
   WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE        12.05 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  15.0  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST             757.16 GRAMS
   ESTIMATED FUEL WEIGHT =    .87KG.
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    TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 600

DATE  4/21/77                  TIME    -0 HRS.            TEST NO.  1
MODEL  1976 KAWASAKI KH-500 FET 1ST CAT+PORT LINERS ENGINE  .5 LITRE  3
DRIVER   KN                    TEST WT.     0 KG.         GVW     0 KG
WET BULB TEMP  18 C            DRY BULB TEMP  24 C        REL. HUM.  51.9 PCT
SPEC. HUM.  10.1 GRAM/KG       BARO.  742.7 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION              12.76 MINUTES
  BLOWER INLET PRESS.   457.2  MM. H2O
  BLOWER DIF.  PRESS.   482.6  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS        9969
  DISTANCE TRAVELED     16.57  KILOMETRES
  BLOWER REVOLUTIONS        9488
  BLOWER CU. CM /REV.    8098

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                      12.4/4
   HC   SAMPLE  PPM                                      1240
   HC   BACKGRD METER READING/SCALE                        .2/4
   HC   BACKGRD PPM                                        20
   CO   SAMPLE  METER READING/SCALE                      93.3/2
   CO   SAMPLE  PPM                                      5439
   CO   BACKGRD METER READING/SCALE                        .1/2
   CO   BACKGRD PPM                                         4
   CO2 SAMPLE  METER READING/SCALE                       64.2/3
   CO2 SAMPLE  PERCENT                                   1.15
   CO2 BACKGRD METER READING/SCALE                        3.1/3
   CO2 BACKGRD PERCENT                                    .05
   NOX SAMPLE  METER READING/SCALE                        .9/2
   NOX SAMPLE  PPM                                         .9
   NOX BACKGRD METER READING/SCALE                        .4/2
   NOX BACKGRD PPM                                         .4
   HC   CONCENTRATION PPM                                1223
   CO   CONCENTRATION PPM                                5705
   CO2 CONCENTRATION PCT                                 1.11
   NOX CONCENTRATION PPM                                   .6
   SO2 COCENTRATION PPM                                  0.0
   HC   MASS (GRAMS)                                    46.83
   CO   MASS (GRAMS)                                   441.11
   CO2 MASS (GRAMS)                                   1350.49
   NOX MASS (GRAMS)                                       .07
   SO2 MASS (GRAMS)                                      0.00
 HC   GRAMS/KILOMETRE        2.83
 CO   GRAMS/KILOMETRE       26.62
 CO2 GRAMS/KILOMETRE        81.50
 NOX GRAMS/KILOMETRE          .00
 SO2 GRAMS/KILOMETRE         0.00

 HC   GRAMS/KG OF FUEL  67.71      HC   GRAMS/MIN     3.67
 CO   GRAMS/KG OF FUEL  637.8      CO   GRAMS/MIN    34.6
 CO2 GRAMS/KG OF FUEL    1953      CO2 GRAMS/MIN     106
 NOX GRAMS/KG OF FUEL     .10      NOX GRAMS/MIN     .01
 SO2 GRAMS/KG OF FUEL    0.00      SO2 GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY
                                             17.60  KILOMETRES/LITRE
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                    TABLE                          VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  600        TEST NO. 2          DATE  4/26/77                        MFGR. CODE   -0                  YR.  1976
VEHICLE MODEL  KH-500 1ST CAT+PORT LINERS  ENGINE    .51 LITRE 3              CURB WT.      0 KG               GVW      0 KG

BAROMETER 746.00 MM OF HG.                                                 WET BULB TEMP  16.7 DEG. C
DRY BULB TEMP.    26.7 DEG. C                                              ABS. HUMIDITY   7.8 GRAMS/KG
REL. HUMIDITY      35 PCT.                                                 DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                           BLOWER INLET PRESS., G1 457.2 MM. H2O
   BLOWER DIF. PRESS., G2, 482.6 MM. H2O                                   BLOWER INLET TEMP.    43 DEG. C
   BAG RESULTS
   BAG NO.                                    1              2              3
   BLOWER REVOLUTIONS                      6252          10746           6260
   POLL COUNTS                              3506           3789           3489
   HC    SAMPLE  METER READING/SCALE       20.3/4         42.3/3         86.7/3
   HC    SAMPLE  PPM                       2030            423            867
   HC    BACKGRD METER READING/SCALE        1.9/3          2.4/3          2.1/3
   HC    BACKGRD PPM                         19             24             21
   CO    SAMPLE  METER READING/SCALE       95.7/3         82.2/3         59.5/2
   CO    SAMPLE  PPM                       2849           2250           3064
   CO    BACKGRD METER READING/SCALE        0.0/3           .1/3           .2/3
   CO    BACKGRD PPM                          0              2              4
   CO2   SAMPLE  METER READING/SCALE       40.2/3         31.3/3         42.3/3
   CO2   SAMPLE  PERCENT                    .68            .52            .72
   CO2   BACKGRD METER READING/SCALE        3.5/3          3.2/3          3.2/3
   CO2   BACKGRD PERCENT                    .05            .05            .05
   NOX   SAMPLE  METER READING/SCALE        1.6/2           .7/2           .9/2
   NOX   SAMPLE  PPM                        1.6             .7             .9
   NOX   BACKGRD METER READING/SCALE         .7/2           .6/2           .6/2
   NOX   BACKGRD PPM                         .7             .6             .6
   SO2   SAMPLE  METER READING/SCALE       -0.0/*         -0.0/*         -0.0/*
   SO2   SAMPLE  PPM                        0.0            0.0            0.0
   SO2   BACKGRD METER READING/SCALE       -0.0/*         -0.0/*         -0.0/*
   SO2   BACKGRD PPM                        0.0            0.0            0.0

   HC    CONCENTRATION PPM                 2013            400            848
   CO    CONCENTRATION PPM                 2779           2200           2983
   CO2   CONCENTRATION PCT                  .63            .47            .68
   NOX   CONCENTRATION PPM                  1.0             .1             .3
   SO2   CONCENTRATION PPM                  0.0            0.0            0.0
   HC    MASS GRAMS                       51.04          17.45          21.53
   CO    MASS GRAMS                      142.29         193.61         152.94
   CO2   MASS GRAMS                      511.44         657.07         547.09
   NOX   MASS GRAMS                         .07            .02            .03
   SO2   MASS GRAMS                        0.00           0.00           0.00
   TOTAL CARBON GRAMS                    244.78         277.46         233.53

   WEIGHTED MASS HC       4.27 GRAMS/KILOMETRE
   WEIGHTED MASS CO      28.24 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     98.17 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .01 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE        12.11 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  15.1  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST               755.76 GRAMS
   ESTIMATED FUEL WEIGHT =    .87KG.
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    TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMBER 600

DATE  4/26/77                 TIME     -0 HRS.          TEST NO.  2
MODEL  1976 KAWASAKI KH500 FET 1ST CAT+PORT LINERS  ENGINE  .5 LITRE  3
DRIVER   KN                   TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  17 C           DRY BULB TEMP  27 C       REL. HUM.  35.1 PCT
SPEC. HUM.   7.8 GRAM/KG    BARO.  746.0 MM  MG.      MEASURED FUEL  0.00 KG

  RUN DURATION            12.75 MINUTES
  BLOWER INLET PRESS.  457.2  MM. H20
  BLOWER DIF.  PRESS.  482.6  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9933
  DISTANCE TRAVELED   16.51  KILOMETRES
  BLOWER REVOLUTIONS     9473
  BLOWER CU. CM /REV.  8102

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                 12.8/4
   HC  SAMPLE  PPM                                 1280
   HC  BACKGRD METER READING/SCALE                  1.9/3
   HC  BACKGRD PPM                                   19
   CO  SAMPLE  METER READING/SCALE                 91.1/2
   CO  SAMPLE  PPM                                 5743
   CO  BACKGRD METER READING/SCALE                   .1/2
   CO  BACKGRD PPM                                    4
   CO2 SAMPLE  METER READING/SCALE                 64.4/3
   CO2 SAMPLE  PERCENT                             1.15
   CO2 BACKGRD METER READING/SCALE                  3.8/3
   CO2 BACKGRD PERCENT                              .06
   NOX SAMPLE  METER READING/SCALE                  1.2/2
   NOX SAMPLE  PPM                                  1.2
   NOX BACKGRD METER READING/SCALE                   .8/2
   NOX BACKGRD PPM                                   .8
   HC  CONCENTRATION PPM                           1264
   CO  CONCENTRATION PPM                           5547
   CO2 CONCENTRATION PCT                           1.10
   NOX CONCENTRATION PPM                             .5
   SO2 COCENTRATION PPM                            0.0
   HC  MASS (GRAMS)                               48.56
   CO  MASS (GRAMS)                              430.39
   CO2 MASS (GRAMS)                             1348.63
   NOX MASS (GRAMS)                                 .06
   SO2 MASS (GRAMS)                                0.00

HC   GRAMS/KILOMETRE      2.94
CO   GRAMS/KILOMETRE     26.07
CO2  GRAMS/KILOMETRE     81.68
NOX  GRAMS/KILOMETRE       .00
SO2  GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL  70.64     HC   GRAMS/MIN   3.81
CO   GRAMS/KG OF FUEL  626.1     CO   GRAMS/MIN   33.8
CO2  GRAMS/KG OF FUEL   1962     CO2  GRAMS/MIN    106
NOX  GRAMS/KG OF FUEL    .09     NOX  GRAMS/MIN    .00
SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                17.64  KILOMETRES/LITRE
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                         TABLE                         VEHICLE EMISSION RESULTS
                                                 1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  500         TEST NO. 1          DATE  5/12/77                          MFGR. CODE    -0                  YR.  1976
VEHICLE MODEL   KH-500 CAT+LEAN+P.L.      ENGINE      .52 LITRE 3                CURB WT.       0 KG               GVM      0 KG

BAROMETER 743.97 MM OF HG.                                                   WET BULB TEMP  18.9 DEG. C
DRY BULB TEMP.    25.6 DEG. C                                                ABS. HUMIDITY  11.1 GRAMS/KG
REL. HUMIDITY      53 PCT.                                                   DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS                                                            BLOWER INLET PRESS., G1 957.2 MM. H2O
                                                                             BLOWER INLET TEMP.    43 DEG. C
     BLOWER DIF. PRESS., G2, 482.6 MM. H2O
     BAG RESULTS
     BAG NO.                                        1                2                3
     BLOWER REVOLUTIONS                          6280            10731             6256
     ROLL COUNTS                                  3942             3796             3508
     HC   SAMPLE  METER READING/SCALE           10.1/4           32.8/3           29.5/3
     HC   SAMPLE  PPM                            1010              328              295
     HC   BACKGRD METER READING/SCALE             .1/4             .1/4            2.1/3
     HC   BACKGRD PPM                              10               10               21
     CO   SAMPLE  METER READING/SCALE           80.2/*           32.9/3           96.0/*
     CO   SAMPLE  PPM                             365              780              498
     CO   BACKGRD METER READING/SCALE             .5/*             .6/*             .3/*
     CO   BACKGRD PPM                               1                2                1
     CO2  SAMPLE  METER READING/SCALE           50.9/3           32.1/3           47.0/3
     CO2  SAMPLE  PERCENT                         .88              .53              .81
     CO2  BACKGRD METER READING/SCALE            4.2/3            3.9/3            4.1/3
     CO2  BACKGRD PERCENT                         .06              .06              .06
     NOX  SAMPLE  METER READING/SCALE            8.4/2            1.4/2            5.9/2
     NOX  SAMPLE  PPM                             8.4              1.4              5.9
     NOX  BACKGRD METER READING/SCALE            1.1/2            1.0/2            1.0/2
     NOX  BACKGRD PPM                             1.1              1.0              1.0
     SO2  SAMPLE  METER READING/SCALE           -0.0/*           -0.0/*           -0.0/*
     SO2  SAMPLE  PPM                             0.0              0.0              0.0
     SO2  BACKGRD METER READING/SCALE           -0.0/*           -0.0/*           -0.0/*
     SO2  BACKGRD PPM                             0.0              0.0              0.0

     HC   CONCENTRATION PPM                      1001              318              275
     CO   CONCENTRATION PPM                       351              757              481
     CO2  CONCENTRATION PCT                       .82              .48              .75
     NOX  CONCENTRATION PPM                       7.4               .4              5.0
     SO2  CONCENTRATION PPM                       0.0              0.0              0.0
     HC   MASS GRAMS                            25.41            13.82             6.97
     CO   MASS GRAMS                            18.00            66.29            29.56
     CO2  MASS GRAMS                           667.79           658.77           605.52
     NOX  MASS GRAMS                              .63              .07              .42
     SO2  MASS GRAMS                             0.00             0.00             0.00
     TOTAL CARBON GRAMS                        211.95           220.17           181.82

     WEIGHTED MASS HC        2.37 GRAMS/KILOMETRE
     WEIGHTED MASS CO        7.28 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     106.75 GRAMS/KILOMETRE
     WEIGHTED MASS NOX        .05 GRAMS/KILOMETRE
     WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE         12.10 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  18.7  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST               613.94 GRAMS
     ESTIMATED FUEL WEIGHT =   .71KG.
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        TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 600

DATE  5/12/77                   TIME    -0 HRS.         TEST NO.  1
MODEL  1976 KAWASAKI KH-500 FET CAT+LEAN +P.L.     ENGINE  .5 LITRE  3
DRIVER   KN                     TEST WT.  1360 KG.      GVW    0 KG
WET BULB TEMP  20 C             DRY BULB TEMP  27 C     REL. HUM.  59.1 PCT
SPEC. HUM.  12.1 GRAM/KG        BARO.  799.0 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.   957.2  MM. H2O
  BLOWER DIF.  PRESS.   982.6  MM  H2O
  BLOWER INLET TEMP.       93  DEG. C
  DYNO REVOLUTIONS       9981
  DISTANCE TRAVELED     16.59  KILOMETRES
  BLOWER REVOLUTIONS       9970
  BLOWER CU. CM /REV.   8097

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE            28.6/3
   HC   SAMPLE  PPM                             286
   HC   BACKGRD METER READING/SCALE             1.7/3
   HC   BACKGRD PPM                              17
   CO   SAMPLE  METER READING/SCALE            69.7/4
   CO   SAMPLE  PPM                             266
   CO   BACKGRD METER READING/SCALE              .1/4
   CO   BACKGRD PPM                               0
   CO2  SAMPLE  METER READING/SCALE            31.0/2
   CO2  SAMPLE  PERCENT                        1.29
   CO2  BACKGRD METER READING/SCALE             1.8/2
   CO2  BACKGRD PERCENT                         .07
   NOX  SAMPLE  METER READING/SCALE            20.8/2
   NOX  SAMPLE  PPM                            20.8
   NOX  BACKGRD METER READING/SCALE             1.6/2
   NOX  BACKGRD PPM                             1.6
   HC   CONCENTRATION PPM                       271
   CO   CONCENTRATION PPM                       254
   CO2  CONCENTRATION PCT                      1.23
   NOX  CONCENTRATION PPM                      19.9
   SO2  COCENTRATION PPM                        0.0
   HC   MASS (GRAMS)                          10.36
   CO   MASS (GRAMS)                          19.65
   CO2  MASS (GRAMS)                        1503.83
   NOX  MASS (GRAMS)                           2.57
   SO2  MASS (GRAMS)                           0.00

 HC   GRAMS/KILOMETRE        .62
 CO   GRAMS/KILOMETRE       1.18
 CO2  GRAMS/KILOMETRE      90.69
 NOX  GRAMS/KILOMETRE        .16
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  80.95      HC   GRAMS/MIN     .81
 CO   GRAMS/KG OF FUEL   39.7      CO   GRAMS/MIN     1.5
 CO2  GRAMS/KG OF FUEL   3091      CO2  GRAMS/MIN     118
 NOX  GRAMS/KG OF FUEL   5.20      NOX  GRAMS/MIN     .20
 SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                        29.69  KILOMETRES/LITRE
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                              TABLE                              VEHICLE EMISSION RESULTS
                                                          1975  LIGHT DUTY EMISSIONS TEST
UNIT NO. 600          TEST NO. 2           DATE  5/16/77                                MFGR. CODE    -0
VEHICLE MODEL  KH-500 CAT+LEAN+P.L.        ENGINE     .52 LITRE 3                       CURR WT.       0 KG                  YR.  1976
                                                                                                                             GVM      0 KG
BAROMETER 740.66 MM OF HG.
DRY BULB TEMP.    24.4 DEG. C                                                    WET BULB TEMP  22.2 DEG. C
REL. HUMIDITY      83 PCT.                                                       ABS. HUMIDITY  16.3 GRAMS/KG
                                                                                 DYNO ROLL CONSTANT    467.47
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 487.7 MM. H2O                                        BLOWER INLET PRESS., G1 462.3 MM. H2O
    BAG RESULTS                                                                  BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                          1                  2                  3
    BLOWER REVOLUTIONS                            6274              10743               6277
    ROLL COUNTS                                   3401               3800               3541
    HC   SAMPLE  METER READING/SCALE            14.2/4             31.1/3             31.9/3
    HC   SAMPLE  PPM                              1420                311                319
    HC   BACKGRD METER READING/SCALE              .4/4               .3/4              1.9/3
    HC   BACKGRD PPM                                40                 30                 19
    CO   SAMPLE  METER READING/SCALE            84.5/*             32.8/3             45.7/*
    CO   SAMPLE  PPM                               438                777                495
    CO   BACKGRD METER READING/SCALE              .2/*               .5/*               .1/3
    CO   BACKGRD PPM                                 1                  1                  2
    CO2  SAMPLE  METER READING/SCALE            47.6/3             31.6/3             44.8/3
    CO2  SAMPLE  PERCENT                           .82                .52                .77
    CO2  BACKGRD METER READING/SCALE             3.8/3              3.4/3              2.9/3
    CO2  BACKGRD PERCENT                           .06                .05                .04
    NOX  SAMPLE  METER READING/SCALE             6.4/2              1.1/2              4.6/2
    NOX  SAMPLE  PPM                               6.4                1.1                4.6
    NOX  BACKGRD METER READING/SCALE             1.0/2               .7/2               .6/2
    NOX  BACKGRD PPM                               1.0                 .7                 .6
    SO2  SAMPLE  METER READING/SCALE            -0.0/*             -0.0/*             -0.0/*
    SO2  SAMPLE  PPM                               0.0                0.0                0.0
    SO2  BACKGRD METER READING/SCALE            -0.0/*             -0.0/*             -0.0/*
    SO2  BACKGRD PPM                               0.0                0.0                0.0

    HC   CONCENTRATION PPM                        1383                282                301
    CO   CONCENTRATION PPM                         419                747                473
    CO2  CONCENTRATION PCT                         .77                .47                .73
    NOX  CONCENTRATION PPM                         6.0                 .4                4.0
    SO2  CONCENTRATION PPM                         0.0                0.0                0.0
    HC   MASS GRAMS                              34.85              12.19               7.59
    CO   MASS GRAMS                              21.31              65.11              24.06
    CO2  MASS GRAMS                             616.36             652.49             583.80
    NOX  MASS GRAMS                                .61                .08                .41
    SO2  MASS GRAMS                               0.00               0.00               0.00
    TOTAL CARBON GRAMS                          207.52             216.68             176.22

    WEIGHTED MASS HC        2.60 GRAMS/KILOMETRE
    WEIGHTED MASS CO        7.27 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     103.35 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        .05 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        12.10 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  14.1  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST                  600.42 GRAMS
    ESTIMATED FUEL WEIGHT =    .64KG.
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     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 600

DATE  5/16/77                  TIME     -0 HRS.          TEST NO.  2
MODEL  1976 KAWASAKI KH500 FET CAT+LEAN +P.L.            ENGINE  .5 LITRE  3
DRIVER   KN                    TEST WT.     0 KG.        GVW    0 KG
WET BULB TEMP  22 C            DRY BULB TEMP  26 C       REL. HUM.  67.8 PCT
SPEC. HUM.  14.8 GRAM/KG       BARO.  740.7 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.77 MINUTES
  BLOWER INLET PRESS.   457.2  MM. H20
  BLOWER DIF.  PRESS.   482.6  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9954
  DISTANCE TRAVELED   16.55  KILOMETRES
  BLOWER REVOLUTIONS      9483
  BLOWER CU. CM /REV.  8095

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                 21.7/3
   HC   SAMPLE  PPM                                  217
   HC   BACKGRD METER READING/SCALE                  1.5/3
   HC   BACKGRD PPM                                   15
   CO   SAMPLE  METER READING/SCALE                 92.0/4
   CO   SAMPLE  PPM                                  225
   CO   BACKGRD METER READING/SCALE                   .6/4
   CO   BACKGRD PPM                                    1
   CO2  SAMPLE  METER READING/SCALE                 70.2/3
   CO2  SAMPLE  PERCENT                             1.27
   CO2  BACKGRD METER READING/SCALE                  3.3/3
   CO2  BACKGRD PERCENT                              .05
   NOX  SAMPLE  METER READING/SCALE                 17.4/2
   NOX  SAMPLE  PPM                                 17.4
   NOX  BACKGRD METER READING/SCALE                  .8/2
   NOX  BACKGRD PPM                                   .8
   HC   CONCENTRATION PPM                            203
   CO   CONCENTRATION PPM                            214
   CO2  CONCENTRATION PCT                           1.22
   NOX  CONCENTRATION PPM                           16.7
   SO2  COCENTRATION PPM                            0.0
   HC   MASS (GRAMS)                                7.76
   CO   MASS (GRAMS)                               16.45
   CO2  MASS (GRAMS)                             1487.25
   NOX  MASS (GRAMS)                                2.43
   SO2  MASS (GRAMS)                                0.00

HC   GRAMS/KILOMETRE        .47
CO   GRAMS/KILOMETRE        .99
CO2  GRAMS/KILOMETRE      89.89
NOX  GRAMS/KILOMETRE        .15
SO2  GRAMS/KILOMETRE       0.00

HC   GRAMS/KG OF FUEL  16.00       HC   GRAMS/MIN     .61
CO   GRAMS/KG OF FUEL   33.9       CO   GRAMS/MIN     1.3
CO2  GRAMS/KG OF FUEL   3065       CO2  GRAMS/MIN     116
NOX  GRAMS/KG OF FUEL   5.02       NOX  GRAMS/MIN     .19
SO2  GRAMS/KG OF FUEL   0.00       SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                       25.05  KILOMETRES/LITRE
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                              TABLE                   VEHICLE EMISSION RESULTS
                                             1975  LIGHT DUTY EMISSIONS TEST
                                                                      MFGR. CODE    -0                YR.  1976
                          TEST NO. 3          DATE  6/17/77           CURB WT.      0 KG              GVM      0 KG
UNIT NO.  600                                 ENGINE     .51 LITRE 3
VEHICLE MODEL  KH-500 CAT+P.L. (NGK)
                                                                   WET BULB TEMP  18.3 DEG. C
BAROMETER 790.92 MM OF HG.                                         ABS. HUMIDITY  10.6 GRAMS/KG
DRY BULB TEMP.    25.0 DEG. C                                      DYNO ROLL CONSTANT    967.97
REL. HUMIDITY       53 PCT.

EXHAUST EMISSIONS                                                  BLOWER INLET PRESS., G1 967.9 MM. H2O
                                                                   BLOWER INLET TEMP.    93 DEG. C
    BLOWER DIF. PRESS., G2, 990.2 MM. H2O
    BAG RESULTS                                                          2                 3
    BAG NO.                                          1                10752              6252
    BLOWER REVOLUTIONS                             6328                3799              3977
    ROLL COUNTS                                    3509              99.3/3            91.1/3
    HC   SAMPLE  METER READING/SCALE             16.3/9                993               911
    HC   SAMPLE  PPM                               1630               .1/9             2.1/3
    HC   BACKGRD METER READING/SCALE               .1/9                 10                21
    HC   BACKGRD PPM                                 10             71.9/3            60.8/2
    CO   SAMPLE  METER READING/SCALE             87.1/3               1883              3161
    CO   SAMPLE  PPM                               2998               .2/3              .1/3
    CO   BACKGRD METER READING/SCALE               .1/3                  9                 2
    CO   BACKGRD PPM                                  2             29.9/3            90.3/3
    CO2  SAMPLE  METER READING/SCALE             36.5/3                .98               .68
    CO2  SAMPLE  PERCENT                            .61              3.9/3             3.5/3
    CO2  BACKGRD METER READING/SCALE              3.3/3                .05               .05
    CO2  BACKGRD PERCENT                            .05               .9/2              .8/2
    NOX  SAMPLE  METER READING/SCALE              1.9/2                 .9                .8
    NOX  SAMPLE  PPM                                1.9               .6/2              .6/2
    NOX  BACKGRD METER READING/SCALE               .7/2                 .6                .6
    NOX  BACKGRD PPM                                 .7            -0.0/*            -0.0/*
    SO2  SAMPLE  METER READING/SCALE             -0.0/*                0.0               0.0
    SO2  SAMPLE  PPM                                0.0            -0.0/*            -0.0/*
    SO2  BACKGRD METER READING/SCALE             -0.0/*                0.0               0.0
    SO2  BACKGRD PPM                                0.0
                                                                       939               892
    HC   CONCENTRATION PPM                         1621               1029              3063
    CO   CONCENTRATION PPM                         2376                .99               .63
    CO2  CONCENTRATION PCT                          .57                 .3                .2
    NOX  CONCENTRATION PPM                           .8                0.0               0.0
    SO2  CONCENTRATION PPM                          0.0              18.71             22.37
    HC   MASS GRAMS                               91.17             159.92            155.19
    CO   MASS GRAMS                              121.82             599.59            507.29
    CO2  MASS GRAMS                              958.73                .05               .02
    NOX  MASS GRAMS                                 .06               0.00              0.00
    SO2  MASS GRAMS                                0.00             298.18            229.35
    TOTAL CARBON GRAMS                           213.07

    WEIGHTED MASS HC       9.06 GRAMS/KILOMETRE
    WEIGHTED MASS CO      29.80 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     89.70 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .01 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        12.11 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  16.7  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST               685.60 GRAMS
    ESTIMATED FUEL WEIGHT =   .79KG.
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                      EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
    TABLE                       VEHICLE NUMBER 600
                                                              TEST NO.  3
                               TIME    -0 HRS.                ENGINE  .5 LITRE  3
DATE  4/13/77
MODEL  1976 KAWASAKI KH-500 FET CAT+P.L. (NGK)                GVW    0 KG
DRIVER   KN                    TEST WT.      0 KG.            REL. HUM.   57.0 PCT
WET BULB TEMP  20 C            DRY BULB TEMP  26 C            MEASURED FUEL   0.00 KG
SPEC. HUM.   12.4 GRAM/KG      BARO.   741.2 MM  HG.

  RUN DURATION              12.76 MINUTES
  BLOWER INLET PRESS.       449.9  MM. H2O
  BLOWER DIF.   PRESS.      492.8  MM  H2O
  BLOWER INLET TEMP.           43  DEG. C
  DYNO REVOLUTIONS          9845
  DISTANCE TRAVELED      16.36  KILOMETRES
  BLOWER REVOLUTIONS          9475
  BLOWER CU. CM /REV.     8028

  BAG RESULTS                                              13.6/4
   HC   SAMPLE  METER READING/SCALE                        1360
   HC   SAMPLE  PPM                                          .1/4
   HC   BACKGRD METER READING/SCALE                          10
   HC   BACKGRD PPM                                        97.3/2
   CO   SAMPLE  METER READING/SCALE                        6288
   CO   SAMPLE  PPM                                          .1/2
   CO   BACKGRD METER READING/SCALE                            4
   CO   BACKGRD PPM                                        60.4/3
   CO2  SAMPLE  METER READING/SCALE                        1.00
   CO2  SAMPLE  PERCENT                                     4.6/3
   CO2  BACKGRD METER READING/SCALE                         .02
   CO2  BACKGRD PERCENT                                      .4/2
   NOX  SAMPLE  METER READING/SCALE                          .4
   NOX  SAMPLE  PPM                                          .5/2
   NOX  BACKGRD METER READING/SCALE                          .5
   NOX  BACKGRD PPM                                        1351
   HC   CONCENTRATION PPM                                  6038
   CO   CONCENTRATION PPM                                  1.02
   CO2  CONCENTRATION PCT                                    .5
   NOX  CONCENTRATION PPM                                  0.0
   SO2  COCENTRATION PPM                                  51.40
   HC   MASS (GRAMS)                                     443.67
   CO   MASS (GRAMS)                                    1234.22
   CO2  MASS (GRAMS)                                        .06
   NOX  MASS (GRAMS)                                       0.00
   SO2  MASS (GRAMS)

 HC   GRAMS/KILOMETRE       3.14
 CO   GRAMS/KILOMETRE      28.31
 CO2  GRAMS/KILOMETRE      75.42
 NOX  GRAMS/KILOMETRE        .00
 SO2  GRAMS/KILOMETRE       0.00
                                        HC   GRAMS/MIN    4.03
 HC   GRAMS/KG OF FUEL   76.43          CO   GRAMS/MIN   36.3
 CO   GRAMS/KG OF FUEL  691.3           CO2  GRAMS/MIN     47
 CO2  GRAMS/KG OF FUEL   1840           NOX  GRAMS/MIN    .00
 NOX  GRAMS/KG OF FUEL    .09           SO2  GRAMS/MIN   0.00
 SO2  GRAMS/KG OF FUEL   0.00                          17.93  KILOMETRES/LITRE
 CARBON BALANCE FUEL ECONOMY
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                    TABLE                          VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  600         TEST NO. 9          DATE  6/20/77                         MFGR. CODE   -0                          YR.  1976
VEHICLE MODEL  KH-500 CAT+P.L. (NGK)      ENGINE    .51 LITRE 3                 CURB WT.      0 KG                       GVW      0 KG

BAROMETER 741.93 MM OF HG.                                                  WET BULB TEMP  19.4 DEG. C
DRY BULB TEMP.    25.6 DEG. C                                               ABS. HUMIDITY  11.8 GRAMS/KG
REL. HUMIDITY      57 PCT.                                                  DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                            BLOWER INLET PRESS., G1 969.9 MM. H20
   BLOWER DIF. PRESS., G2, 987.7 MM. H20                                    BLOWER INLET TEMP.    43 DEG. C
   BAG RESULTS
   BAG NO.                                         1                  2                  3
   BLOWER REVOLUTIONS                            6301              10744               6251
   ROLL COUNTS                                   3485               3777               3470
   HC    SAMPLE  METER READING/SCALE            13.7/4             47.0/3             81.1/3
   HC    SAMPLE  PPM                            1370                470                811
   HC    BACKGRD METER READING/SCALE              .1/4               .1/4              2.4/3
   HC    BACKGRD PPM                              10                 10                 24
   CO    SAMPLE  METER READING/SCALE            83.8/3             76.9/3             71.9/3
   CO    SAMPLE  PPM                            2313               2054               1883
   CO    BACKGRD METER READING/SCALE              .1/3               .5/3               .2/3
   CO    BACKGRD PPM                               2                 11                  4
   CO2   SAMPLE  METER READING/SCALE            37.3/3             30.0/3             31.9/3
   CO2   SAMPLE  PERCENT                         .63                .50                .53
   CO2   BACKGRD METER READING/SCALE             3.4/3              3.4/3              3.2/3
   CO2   BACKGRD PERCENT                         .05                .05                .05
   NOX   SAMPLE  METER READING/SCALE              .9/2               .3/2               .3/2
   NOX   SAMPLE  PPM                              .9                 .3                 .3
   NOX   BACKGRD METER READING/SCALE              .3/2               .2/2               .2/2
   NOX   BACKGRD PPM                              .3                 .2                 .2
   SO2   SAMPLE  METER READING/SCALE            -0.0/*             -0.0/*             -0.0/*
   SO2   SAMPLE  PPM                             0.0                0.0                0.0
   SO2   BACKGRD METER READING/SCALE            -0.0/*             -0.0/*             -0.0/*
   SO2   BACKGRD PPM                             0.0                0.0                0.0

   HC    CONCENTRATION PPM                      1361                461                788
   CO    CONCENTRATION PPM                      2240               1987               1825
   CO2   CONCENTRATION PCT                       .58                .45                .48
   NOX   CONCENTRATION PPM                       .6                 .1                 .1
   SO2   CONCENTRATION PPM                      0.0                0.0                0.0
   HC    MASS GRAMS                            34.45              19.88              19.80
   CO    MASS GRAMS                           114.51             173.17              92.55
   CO2   MASS GRAMS                           467.83             614.46             387.20
   NOX   MASS GRAMS                             .05                .02                .01
   SO2   MASS GRAMS                            0.00               0.00               0.00
   TOTAL CARBON GRAMS                         206.60             259.16             162.50

   WEIGHTED MASS HC       3.81 GRAMS/KILOMETRE
   WEIGHTED MASS CO      22.81 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     85.90 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .00 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE       12.07 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  17.6  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST              628.27 GRAMS
   ESTIMATED FUEL WEIGHT =   .73KG.
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    TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 600

DATE  6/20/77                  TIME     -0 HRS.          TEST NO.  4
MODEL  1976 KAWASAKI KH-500 FET CAT+P.L. (NGK)           ENGINE  .5 LITRE  3
DRIVER   KN                    TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  21 C            DRY BULB TEMP  27 C       REL. HUM.  54.7 PCT
SPEC. HUM.  12.7 GRAM/KG       BARO.  741.4 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.77 MINUTES
  BLOWER INLET PRESS.   457.2  MM. H20
  BLOWER DIF.  PRESS.   402.6  MM  H20
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS       9847
  DISTANCE TRAVELED    16.37  KILOMETRES
  BLOWER REVOLUTIONS      9404
  BLOWER CU. CM /REV.  8096

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE            11.4/4
   HC  SAMPLE  PPM                            1140
   HC  BACKGRD METER READING/SCALE              .1/4
   HC  BACKGRD PPM                              10
   CO  SAMPLE  METER READING/SCALE            86.5/2
   CO  SAMPLE  PPM                            5328
   CO  BACKGRD METER READING/SCALE              .2/2
   CO  BACKGRD PPM                               8
   CO2 SAMPLE  METER READING/SCALE            50.2/3
   CO2 SAMPLE  PERCENT                         .87
   CO2 BACKGRD METER READING/SCALE             3.6/3
   CO2 BACKGRD PERCENT                         .06
   NOX SAMPLE  METER READING/SCALE             1.2/2
   NOX SAMPLE  PPM                             1.2
   NOX BACKGRD METER READING/SCALE              .6/2
   NOX BACKGRD PPM                              .6
   HC  CONCENTRATION PPM                     1131
   CO  CONCENTRATION PPM                     5138
   CO2 CONCENTRATION PCT                      .82
   NOX CONCENTRATION PPM                       .7
   SO2 COCENTRATION PPM                      0.0
   HC  MASS (GRAMS)                         43.21
   CO  MASS (GRAMS)                        396.24
   CO2 MASS (GRAMS)                       1001.16
   NOX MASS (GRAMS)                           .09
   SO2 MASS (GRAMS)                          0.00

HC  GRAMS/KILOMETRE     2.64
CO  GRAMS/KILOMETRE    24.21
CO2 GRAMS/KILOMETRE    61.17
NOX GRAMS/KILOMETRE      .01
SO2 GRAMS/KILOMETRE    0.00

HC  GRAMS/KG OF FUEL  77.78     HC  GRAMS/MIN   3.38
CO  GRAMS/KG OF FUEL  713.3     CO  GRAMS/MIN   31.0
CO2 GRAMS/KG OF FUEL  1802      CO2 GRAMS/MIN     78
NOX GRAMS/KG OF FUEL   .16      NOX GRAMS/MIN    .01
SO2 GRAMS/KG OF FUEL  0.00      SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                    21.65  KILOMETRES/LITRE
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                        TABLE                        VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
                                                                  MFGR. CODE    -0                 YR.  1976
UNIT NO.  600        TEST NO. 3          DATE  6/21/77            CURB WT.      0 KG               GVW      0 KG
VEHICLE MODEL  KH-500 CAT+PL+LN (NGK)    ENGINE    .51 LITRE 3

                                                                  WET BULB TEMP  20.0 DEG. C
BAROMETER 741.43 MM OF HG.                                        ABS. HUMIDITY  12.1 GRAMS/KG
DRY BULB TEMP.    26.7 DEG. C                                     DYNO ROLL CONSTANT   967.97
REL. HUMIDITY      54 PCT.

EXHAUST EMISSIONS                                                 BLOWER INLET PRESS., G1 457.2 MM. H2O
                                                                  BLOWER INLET TEMP.   43 DEG. C
    BLOWER DIF. PRESS., G2, 482.6 MM. H2O
    BAG RESULTS
    BAG NO.                                      1            2            3
    BLOWER REVOLUTIONS                        6302        10739         6247
    ROLL COUNTS                               3340         3711         3953
    HC   SAMPLE  METER READING/SCALE          92.0/3       30.1/3       37.1/3
    HC   SAMPLE  PPM                           920          301          371
    HC   BACKGRD METER READING/SCALE           2.3/3        3.4/3        2.5/3
    HC   BACKGRD PPM                            23           34           25
    CO   SAMPLE  METER READING/SCALE          22.6/3       40.0/3       31.4/3
    CO   SAMPLE  PPM                           523          963          742
    CO   BACKGRD METER READING/SCALE            .1/3         .1/3         .1/3
    CO   BACKGRD PPM                             2            2            2
    CO2  SAMPLE  METER READING/SCALE          43.2/3       30.3/3       41.5/3
    CO2  SAMPLE  PERCENT                        .74          .50          .71
    CO2  BACKGRD METER READING/SCALE           3.5/3        4.1/3        3.8/3
    CO2  BACKGRD PERCENT                        .05          .06          .06
    NOX  SAMPLE  METER READING/SCALE           3.4/2         .7/2        1.7/2
    NOX  SAMPLE  PPM                           3.4           .7          1.7
    NOX  BACKGRD METER READING/SCALE            .7/2         .8/2         .6/2
    NOX  BACKGRD PPM                            .7           .8           .6
    SO2  SAMPLE  METER READING/SCALE          -0.0/*       -0.0/*       -0.0/*
    SO2  SAMPLE  PPM                           0.0          0.0          0.0
    SO2  BACKGRD METER READING/SCALE          -0.0/*       -0.0/*       -0.0/*
    SO2  BACKGRD PPM                           0.0          0.0          0.0

    HC   CONCENTRATION PPM                     899          269          348
    CO   CONCENTRATION PPM                     504          935          717
    CO2  CONCENTRATION PCT                     .69          .44          .65
    NOX  CONCENTRATION PPM                     2.7          -.1          1.1
    SO2  CONCENTRATION PPM                     0.0          0.0          0.0
    HC   MASS GRAMS                          22.81        11.62         8.74
    CO   MASS GRAMS                          25.83        81.64        36.41
    CO2  MASS GRAMS                         556.38       608.13       522.22
    NOX  MASS GRAMS                            .24         -.01          .10
    SO2  MASS GRAMS                           0.00         0.00         0.00
    TOTAL CARBON GRAMS                      182.66       211.03       165.71

    WEIGHTED MASS HC       2.23 GRAMS/KILOMETRE
    WEIGHTED MASS CO       9.60 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     96.81 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .01 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        11.83 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  19.8  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              559.40 GRAMS
    ESTIMATED FUEL WEIGHT =    .65KG.
    TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                             VEHICLE NUMBER 600

DATE  6/21/77                    TIME    -0 HRS.            TEST NO.  3
MODEL  1976 KAWASAKI KH-500 FET CAT+PL+LN (NGK)    ENGINE  .5 LITRE  3
DRIVER   KN                      TEST WT.       0 KG.       GVW     0 KG
WET BULB TEMP  20 C              DRY BULB TEMP  26 C        REL. HUM.  57.0 PCT
SPFC. HUM.  12.3 GRAM/KG         BARO.  742.9 MM  HG.       MEASURED FUEL  0.00 KG

  RUN DURATION           12.77 MINUTES
  BLOWER INLET PRESS.   457.2  MM. H2O
  BLOWER DIF.  PRESS.   482.6  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS        9821
  DISTANCE TRAVELED      16.32  KILOMETRES
  BLOWER REVOLUTIONS       9486
  BLOWER CU. CM /REV.   8098

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                33.9/3
   HC  SAMPLE  PPM                                 339
   HC  BACKGRD METER READING/SCALE                 1.9/3
   HC  BACKGRD PPM                                  19
   CO  SAMPLE  METER READING/SCALE                26.5/3
   CO  SAMPLE  PPM                                 619
   CO  BACKGRD METER READING/SCALE                  .1/3
   CO  BACKGRD PPM                                   2
   CO2 SAMPLE  METER READING/SCALE                64.9/3
   CO2 SAMPLE  PERCENT                             1.16
   CO2 BACKGRD METER READING/SCALE                 3.1/3
   CO2 BACKGRD PERCENT                              .05
   NOX SAMPLE  METER READING/SCALE                 4.2/2
   NOX SAMPLE  PPM                                 4.2
   NOX BACKGRD METER READING/SCALE                  .5/2
   NOX BACKGRD PPM                                  .5
   HC  CONCENTRATION PPM                           326
   CO  CONCENTRATION PPM                           592
   CO2 CONCENTRATION PCT                           1.12
   NOX CONCENTRATION PPM                           3.7
   SO2 COCENTRATION PPM                            0.0
   HC  MASS (GRAMS)                               12.50
   CO  MASS (GRAMS)                               45.75
   CO2 MASS (GRAMS)                             1365.28
   NOX MASS (GRAMS)                                 .50
   SO2 MASS (GRAMS)                                0.00

  HC  GRAMS/KILOMETRE         .77
  CO  GRAMS/KILOMETRE        2.80
  CO2 GRAMS/KILOMETRE       83.63
  NOX GRAMS/KILOMETRE         .03
  SO2 GRAMS/KILOMETRE        0.00

  HC  GRAMS/KG OF FUEL  26.82      HC  GRAMS/MIN      .98
  CO  GRAMS/KG OF FUEL   98.2      CO  GRAMS/MIN      3.6
  CO2 GRAMS/KG OF FUEL   2930      CO2 GRAMS/MIN      107
  NOX GRAMS/KG OF FUEL   1.08      NOX GRAMS/MIN      .04
  SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN     0.00
  CARBON BALANCE FUEL ECONOMY                       25.79  KILOMETRES/LITRE
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                     TABLE                          VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  600        TEST NO. 4         DATE  6/22/77                      MFGR. CODE   -0                       YR.  1976
VEHICLE MODEL  KH-500 CAT+PL+LN (NGK)   ENGINE     .51 LITRE 3             CURB WT.     0 KG                     GVM      0 KG

BAROMETER 742.95 MM OF HG.                                            WET BULB TEMP  19.4 DEG. C
DRY BULB TEMP.   25.6 DEG. C                                          ABS. HUMIDITY  11.8 GRAMS/KG
REL. HUMIDITY     57 PCT.                                             DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                      BLOWER INLET PRESS., G1 449.6 MM. H2O
   BLOWER DIF. PRESS., G2, 480.1 MM. H2O                              BLOWER INLET TEMP.   43 DEG. C
   BAG RESULTS
   BAG NO.                                     1              2              3
   BLOWER REVOLUTIONS                        6259          10749           6214
   ROLL COUNTS                               3426           3731           3457
   HC   SAMPLE  METER READING/SCALE        95.5/3         32.8/3         37.2/3
   HC   SAMPLE  PPM                          955            328            372
   HC   BACKGRD METER READING/SCALE         1.5/3          1.8/3          1.3/3
   HC   BACKGRD PPM                           15             18             13
   CO   SAMPLE  METER READING/SCALE        47.3/*         42.7/3         27.2/3
   CO   SAMPLE  PPM                          511           1034            636
   CO   BACKGRD METER READING/SCALE          .2/*           .5/*           .1/3
   CO   BACKGRD PPM                            1              1              2
   CO2  SAMPLE  METER READING/SCALE        50.3/3         32.3/3         44.0/3
   CO2  SAMPLE  PERCENT                      .87            .54            .75
   CO2  BACKGRD METER READING/SCALE         3.4/3          3.2/3          2.7/3
   CO2  BACKGRD PERCENT                      .05            .05            .04
   NOX  SAMPLE  METER READING/SCALE         4.4/2           .7/2          2.8/2
   NOX  SAMPLE  PPM                          4.4             .7            2.8
   NOX  BACKGRD METER READING/SCALE          .5/2           .4/2           .4/2
   NOX  BACKGRD PPM                           .5             .4             .4
   SO2  SAMPLE  METER READING/SCALE        -0.0/*         -0.0/*         -0.0/*
   SO2  SAMPLE  PPM                          0.0            0.0            0.0
   SO2  BACKGRD METER READING/SCALE        -0.0/*         -0.0/*         -0.0/*
   SO2  BACKGRD PPM                          0.0            0.0            0.0

   HC   CONCENTRATION PPM                    941            311            360
   CO   CONCENTRATION PPM                    443           1003            613
   CO2  CONCENTRATION PCT                    .82            .49            .71
   NOX  CONCENTRATION PPM                    3.9             .3            2.4
   SO2  CONCENTRATION PPM                    0.0            0.0            0.0
   HC   MASS GRAMS                         23.81          13.51           9.03
   CO   MASS GRAMS                         25.17          88.02          31.07
   CO2  MASS GRAMS                        665.40         679.34         571.19
   NOX  MASS GRAMS                           .34            .05            .21
   SO2  MASS GRAMS                          0.00           0.00           0.00
   TOTAL CARBON GRAMS                     213.01         239.84         177.03

   WEIGHTED MASS HC      2.42 GRAMS/KILOMETRE
   WEIGHTED MASS CO      9.77 GRAMS/KILOMETRE
   WEIGHTED MASS CO2   108.25 GRAMS/KILOMETRE
   WEIGHTED MASS NOX      .03 GRAMS/KILOMETRE
   WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE       11.93 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  17.9  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST             629.88 GRAMS
   ESTIMATED FUEL WEIGHT =   .72KG.
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TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                         VEHICLE NUMBER 600

                             TIME     -0 HRS.              TEST NO.  9
DATE  6/22/77
MODEL  1976 KAWASAKI KH-500 FET CAT+PL+LN (NGK)           ENGINE  .5 LITRE  3
DRIVER   KN                  TEST WT.      0 KG.           GVW    0 KG
WET BULB TEMP  19 C          DRY BULB TEMP  26 C           REL. HUM.  56.5 PCT
SPEC. HUM.  11.8 GRAM/KG     BARO.  741.9 MM  HG.          MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.   459.7  MM. H2O
  BLOWER DIF.  PRESS.   495.3  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS       9898
  DISTANCE TRAVELED     16.37  KILOMETRES
  BLOWER REVOLUTIONS      9485
  BLOWER CU. CM /REV.   8077

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                 31.1/3
   HC  SAMPLE  PPM                                  311
   HC  BACKGRD METER READING/SCALE                  1.0/3
   HC  BACKGRD PPM                                   10
   CO  SAMPLE  METER READING/SCALE                 25.3/3
   CO  SAMPLE  PPM                                  589
   CO  BACKGRD METER READING/SCALE                   .1/3
   CO  BACKGRD PPM                                    2
   CO2 SAMPLE  METER READING/SCALE                 67.3/3
   CO2 SAMPLE  PERCENT                              1.21
   CO2 BACKGRD METER READING/SCALE                  3.2/3
   CO2 BACKGRD PERCENT                               .05
   NOX SAMPLE  METER READING/SCALE                  6.6/2
   NOX SAMPLE  PPM                                  6.6
   NOX BACKGRD METER READING/SCALE                   .5/2
   NOX BACKGRD PPM                                    .5
   HC  CONCENTRATION PPM                            302
   CO  CONCENTRATION PPM                            563
   CO2 CONCENTRATION PCT                           1.17
   NOX CONCENTRATION PPM                            6.1
   SO2 COCENTRATION PPM                            0.0
   HC  MASS (GRAMS)                               11.52
   CO  MASS (GRAMS)                               43.34
   CO2 MASS (GRAMS)                             1417.31
   NOX MASS (GRAMS)                                 .81
   SO2 MASS (GRAMS)                                0.00

 HC  GRAMS/KILOMETRE       .70
 CO  GRAMS/KILOMETRE      2.65
 CO2 GRAMS/KILOMETRE     86.58
 NOX GRAMS/KILOMETRE       .05
 SO2 GRAMS/KILOMETRE      0.00

 HC  GRAMS/KG OF FUEL  23.99     HC  GRAMS/MIN    .90
 CO  GRAMS/KG OF FUEL   90.2     CO  GRAMS/MIN    3.4
 CO2 GRAMS/KG OF FUEL   2952     CO2 GRAMS/MIN    111
 NOX GRAMS/KG OF FUEL   1.68     NOX GRAMS/MIN    .06
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                  25.09  KILOMETRES/LITRE
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                          TABLE                      VEHICLE EMISSION RESULTS
                                           1975  LIGHT DUTY EMISSIONS TEST
                                     DATE  6/24/77                MFGR. CODE    -0              YR.  1976
UNIT NO.  600           TEST NO. 1                                CURB WT.      0 KG            GVM      0 KG
VEHICLE MODEL  KH500 CAT+LN+AIR +PL (NGK) ENGINE    .51 LITRE 3

                                                            WET BULB TEMP  19.4 DEG. C
BAROMETER 743.96 MM OF HG.                                  ABS. HUMIDITY  12.3 GRAMS/KG
DRY BULB TEMP.    24.9 DEG. C                               DYNO ROLL CONSTANT   967.97
REL. HUMIDITY      63 PCT.

EXHAUST EMISSIONS                                           BLOWER INLET PRESS., G1 469.9 MM. H2O
                                                            BLOWER INLET TEMP.    43 DEG. C
    BLOWER DIF. PRESS., G2, 492.8 MM. H2O
    BAG RESULTS
    BAG NO.                                   1              2               3
    BLOWER REVOLUTIONS                     6279          10755            6277
    ROLL COUNTS                            3469           3788            3483
    HC    SAMPLE  METER READING/SCALE    93.9/3         59.8/2          12.0/3
    HC    SAMPLE  PPM                       939             60             120
    HC    BACKGRD METER READING/SCALE     2.8/3          2.7/3           1.3/3
    HC    BACKGRD PPM                        28             27              13
    CO    SAMPLE  METER READING/SCALE    56.6/*         58.3/*          50.6/*
    CO    SAMPLE  PPM                       124            128             109
    CO    BACKGRD METER READING/SCALE      .4/*           .8/*            .9/*
    CO    BACKGRD PPM                         1              1               2
    CO2   SAMPLE  METER READING/SCALE    51.1/3         37.9/3          47.8/3
    CO2   SAMPLE  PERCENT                   .89            .64             .82
    CO2   BACKGRD METER READING/SCALE     3.7/3          3.7/3           3.4/3
    CO2   BACKGRD PERCENT                   .06            .06             .05
    NOX   SAMPLE  METER READING/SCALE     6.3/2          1.8/2           4.9/2
    NOX   SAMPLE  PPM                       6.3            1.8             4.9
    NOX   BACKGRD METER READING/SCALE      .9/2           .8/2            .6/2
    NOX   BACKGRD PPM                        .9             .8              .6
    SO2   SAMPLE  METER READING/SCALE    -0.0/*         -0.0/*          -0.0/*
    SO2   SAMPLE  PPM                       0.0            0.0             0.0
    SO2   BACKGRD METER READING/SCALE    -0.0/*         -0.0/*          -0.0/*
    SO2   BACKGRD PPM                       0.0            0.0             0.0

    HC    CONCENTRATION PPM                 913             34             108
    CO    CONCENTRATION PPM                 119            123             104
    CO2   CONCENTRATION PCT                 .84            .58             .78
    NOX   CONCENTRATION PPM                 5.5            1.0             4.3
    SO2   CONCENTRATION PPM                 0.0            0.0             0.0
    HC    MASS GRAMS                      23.08           1.98            2.72
    CO    MASS GRAMS                       6.06          10.73            5.29
    CO2   MASS GRAMS                     673.75         807.57          625.36
    NOX   MASS GRAMS                        .48            .16             .38
    SO2   MASS GRAMS                       0.00           0.00            0.00
    TOTAL CARBON GRAMS                   206.96         226.28          175.30

    WEIGHTED MASS HC       1.07 GRAMS/KILOMETRE
    WEIGHTED MASS CO       1.35 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    120.38 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .05 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.08 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  18.6  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              608.04 GRAMS
    ESTIMATED FUEL WEIGHT =   .70KG.
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   TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 600

                                TIME     -0 HRS.          TEST NO.  1
DATE  6/29/77
MODEL  1976 KAWASAKI KH-500 FET CAT+LN+AIR+PL (NGK)ENGINE  .5 LITRE  3
DRIVER   KN                     TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  20 C             DRY BULB TEMP  27 C      REL. HUM.  59.1 PCT
SPEC. HUM.  12.1 GRAM/KG        BARO.  742.7 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.   454.7  MM. H20
  BLOWER DIF.  PRESS.   457.2  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9857
  DISTANCE TRAVELED    16.38  KILOMETRES
  BLOWER REVOLUTIONS      9476
  BLOWER CU. CM /REV.  8139

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                 12.7/3
   HC   SAMPLE  PPM                                  127
   HC   BACKGRD METER READING/SCALE                  1.5/3
   HC   BACKGRD PPM                                   15
   CO   SAMPLE  METER READING/SCALE                 59.6/*
   CO   SAMPLE  PPM                                   57
   CO   BACKGRD METER READING/SCALE                   .5/*
   CO   BACKGRD PPM                                    0
   CO2  SAMPLE  METER READING/SCALE                 70.9/3
   CO2  SAMPLE  PERCENT                              1.28
   CO2  BACKGRD METER READING/SCALE                  9.1/3
   CO2  BACKGRD PERCENT                               .06
   NOX  SAMPLE  METER READING/SCALE                 13.0/2
   NOX  SAMPLE  PPM                                 13.0
   NOX  BACKGRD METER READING/SCALE                   .7/2
   NOX  BACKGRD PPM                                    .7
   HC   CONCENTRATION PPM                             113
   CO   CONCENTRATION PPM                              59
   CO2  CONCENTRATION PCT                            1.23
   NOX  CONCENTRATION PPM                            12.9
   SO2  COCENTRATION PPM                              0.0
   HC   MASS (GRAMS)                                 9.36
   CO   MASS (GRAMS)                                 4.21
   CO2  MASS (GRAMS)                              1502.67
   NOX  MASS (GRAMS)                                 1.65
   SO2  MASS (GRAMS)                                 0.00

 HC   GRAMS/KILOMETRE        .27
 CO   GRAMS/KILOMETRE        .26
 CO2  GRAMS/KILOMETRE      91.71
 NOX  GRAMS/KILOMETRE        .10
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL   9.08      HC   GRAMS/MIN     .39
 CO   GRAMS/KG OF FUEL    8.8      CO   GRAMS/MIN      .3
 CO2  GRAMS/KG OF FUEL   3127      CO2  GRAMS/MIN     118
 NOX  GRAMS/KG OF FUEL   3.49      NOX  GRAMS/MIN     .13
 SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                      25.05  KILOMETRES/LITRE
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                    TABLE                            VEHICLE EMISSION RESULTS
                                                1975  LIGHT DUTY EMISSIONS TEST
                                       DATE  6/25/77                  MFGR. CODE   -0                YR.  1976
UNIT NO.  600          TEST NO. 2                                     CURB WT.      0 KG             GVW      0 KG
VEHICLE MODEL  KH500 CAT+LN+AIR + PL (NGK) ENGINE    .51 LITRE 3
                                                                      WET BULB TEMP  18.9 DEG. C
BAROMETER 742.45 MM OF HG.                                            ABS. HUMIDITY  11.3 GRAMS/KG
DRY BULB TEMP.    25.0 DEG. C                                         DYNO ROLL CONSTANT   967.97
REL. HUMIDITY     56 PCT.

EXHAUST EMISSIONS                                                     BLOWER INLET PRESS., G1 457.2 MM. H2O
                                                                      BLOWER INLET TEMP.    43 DEG. C
    BLOWER DIF. PRESS., G2, 487.7 MM. H2O
    BAG RESULTS                                    1               2                3
    BAG NO.                                     6271           10755             6262
    BLOWER REVOLUTIONS                           3396           3765             3440
    ROLL COUNTS                                 10.3/4          66.8/2           97.0/2
    HC    SAMPLE  METER READING/SCALE           1030              67               97
    HC    SAMPLE  PPM                            .1/4            .1/4           15.9/2
    HC    BACKGRD METER READING/SCALE             10              10               16
    HC    BACKGRD PPM                           52.5/*          70.2/*           56.7/*
    CO    SAMPLE  METER READING/SCALE            114             159              124
    CO    SAMPLE  PPM                            .1/*            .4/*             .2/*
    CO    BACKGRD METER READING/SCALE              0               1                0
    CO    BACKGRD PPM                           49.4/3          37.4/3           44.7/3
    CO2   SAMPLE  METER READING/SCALE            .86             .63              .77
    CO2   SAMPLE  PERCENT                       4.3/3           4.0/3            4.0/3
    CO2   BACKGRD METER READING/SCALE            .07             .06              .06
    CO2   BACKGRD PERCENT                       6.0/2           1.7/2            4.1/2
    NOX   SAMPLE  METER READING/SCALE            6.0             1.7              4.1
    NOX   SAMPLE  PPM                            .6/2            .5/2             .4/2
    NOX   BACKGRD METER READING/SCALE             .6              .5               .4
    NOX   BACKGRD PPM                          -0.0/*          -0.0/*           -0.0/*
    SO2   SAMPLE  METER READING/SCALE            0.0             0.0              0.0
    SO2   SAMPLE  PPM                          -0.0/*          -0.0/*           -0.0/*
    SO2   BACKGRD METER READING/SCALE            0.0             0.0              0.0
    SO2   BACKGRD PPM
                                                1021              57               82
    HC    CONCENTRATION PPM                      110             154              120
    CO    CONCENTRATION PPM                      .79             .57              .71
    CO2   CONCENTRATION PCT                      5.4             1.2              3.7
    NOX   CONCENTRATION PPM                      0.0             0.0              0.0
    SO2   CONCENTRATION PPM                    25.82            2.48             2.07
    HC    MASS GRAMS                            5.60           13.48             6.11
    CO    MASS GRAMS                          640.58          790.05           570.18
    CO2   MASS GRAMS                             .47             .18              .32
    NOX   MASS GRAMS                            0.00            0.00             0.00
    SO2   MASS GRAMS                          199.58          223.55           160.03
    TOTAL CARBON GRAMS

    WEIGHTED MASS HC       1.24 GRAMS/KILOMETRE
    WEIGHTED MASS CO       1.62 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    116.41 GRAMS/KILOMETRE
    WEIGHTED MASS NOX      .05 GRAMS/KILOMETRE
    WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.45 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  19.1  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              583.15 GRAMS
    ESTIMATED FUEL WEIGHT =   .67KG.
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     TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 600

DATE  6/25/77                    TIME     -0 HRS.          TEST NO.  2
MODEL  1976 KAWASAKI KH-500 FET CAT+LN+AIR+PL (NGK)ENGINE  .5 LITRE  3
DRIVER   KN                      TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  19 C              DRY BULB TEMP  27 C       REL. HUM.  50.8 PCT
SPEC. HUM.  11.3 GRAM/KG         BARO.  742.7 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION            12.76 MINUTES
  BLOWER INLET PRESS.   464.8  MM. H2O
  BLOWER DIF.  PRESS.   495.3  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS       9859
  DISTANCE TRAVELED     16.39  KILOMETRES
  BLOWER REVOLUTIONS       9473
  BLOWER CU. CM /REV.   8075

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                    12.4/3
   HC   SAMPLE  PPM                                     124
   HC   BACKGRD METER READING/SCALE                     1.4/3
   HC   BACKGRD PPM                                      14
   CO   SAMPLE  METER READING/SCALE                    46.0/*
   CO   SAMPLE  PPM                                      43
   CO   BACKGRD METER READING/SCALE                      .9/*
   CO   BACKGRD PPM                                       1
   CO2  SAMPLE  METER READING/SCALE                    70.7/3
   CO2  SAMPLE  PERCENT                                1.28
   CO2  BACKGRD METER READING/SCALE                     3.8/3
   CO2  BACKGRD PERCENT                                 .06
   NOX  SAMPLE  METER READING/SCALE                    12.3/2
   NOX  SAMPLE  PPM                                    12.3
   NOX  BACKGRD METER READING/SCALE                     .5/2
   NOX  BACKGRD PPM                                      .5
   HC   CONCENTRATION PPM                               111
   CO   CONCENTRATION PPM                                41
   CO2  CONCENTRATION PCT                              1.23
   NOX  CONCENTRATION PPM                              11.8
   SO2  COCENTRATION PPM                               0.0
   HC   MASS (GRAMS)                                   4.24
   CO   MASS (GRAMS)                                   3.13
   CO2  MASS (GRAMS)                                1488.91
   NOX  MASS (GRAMS)                                   1.53
   SO2  MASS (GRAMS)                                   0.00

 HC   GRAMS/KILOMETRE       .26
 CO   GRAMS/KILOMETRE       .19
 CO2  GRAMS/KILOMETRE     90.85
 NOX  GRAMS/KILOMETRE       .09
 SO2  GRAMS/KILOMETRE      0.00

 HC   GRAMS/KG OF FUEL   8.92      HC   GRAMS/MIN     .33
 CO   GRAMS/KG OF FUEL    6.6      CO   GRAMS/MIN      .2
 CO2  GRAMS/KG OF FUEL   3131      CO2  GRAMS/MIN     117
 NOX  GRAMS/KG OF FUEL   3.21      NOX  GRAMS/MIN     .12
 SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY
                                              25.31  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 3/8/77 Sequence KES-1 Stock Baseline

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	2000	-	4.61	5.22	9.3	17	100,000
20	2	5500	0.42	6.15	8.30	4.0	16	40,000
30	4	4400	1.00	6.03	8.95	3.2	25	22,800
40	5	4800	1.83	8.33	8.07	2.8	39	30,800
50	5	6000	2.96	10.58	5.85	3.8	26	49,600
Idle	N	2100	-	5.29	5.19	8.4	20	100,000

Notes: Setting - as received

Max. head temp @ 50 mph = 210°C

Max. exhaust gas temp @ station #1 = 620°C

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 3/9/77 Sequence KES-2 Stock Baseline

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1300	-	4.56	4.52	10.6	14	131,000
20	2	5400	0.49	5.56	8.26	4.8	15	52,000
30	4	4350	1.04	5.92	9.08	3.3	21	35,200
40	5	4750	1.90	8.09	8.11	2.9	35	34,600
50	5	5900	3.11	10.10	9.59	2.8	30	52,400
Idle	N	1350	-	4.82	4.39	9.8	18	144,000

Notes: Conducted after idle speed adjustment

No temp. data taken

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 3/26/77 Sequence KES-3, Stock Rotary Valve Advanced 26°

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1100	-	3.54	3.68	12.3	12	86,400
20	2	5400	0.40	5.43	7.37	6.4	17	45,600
30	4	4350	0.99	5.85	8.49	4.7	19	31,200
40	5	4700	1.82	7.52	8.30	3.4	36	26,000
50	5	5900	2.91	11.18	5.81	3.6	20	43,400
Idle	N	1200	-	3.91	2.98	11.6	18	94,700

Notes: Carburetor adjustment - as received - no insulation applied
Max. head temp. @ 50 mph approx. 205°C
Exhaust gas temp @ station #1, 40 mph ∿ 595°C, 50 mph ∿ 645°C
Exhaust gas temp @ station #2, 40 mph ∿ 550°C, 50 mph ∿ 650°C
Higher temp at Station #2 implies reaction occurring in exhaust pipe
W.O.T. accel time 0-100 kph = 26.2 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 3/28/77 Sequence KES-4, Stock Rotary Valve Retarded 26°

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1150	-	4.28	4.52	10.9	16	108,000
20	2	5300	0.44	5.56	8.20	5.5	17	53,600
30	4	4200	1.00	6.30	8.74	3.7	22	36,000
40	5	4700	1.81	8.55	7.92	2.9	31	31,600
50	5	5900	3.01	11.78	5.41	3.5	15	48,000
Idle	N	1150	-	4.65	4.64	9.7	15	111,000

Notes: Carburetor adjustment - as received - no insulation applied
Max. head temp. @ 50 mph approx. 185°C
Exhaust gas temp @ station #1, 40 mph ∿ 595°C, 50 mph ∿ 640°C
Exhaust gas temp # station #2, 40 mph ∿ 550°C, 50 mph ∿ 650°C
Higher temp at station #2 implies reaction occurring in exhaust pipe
W.O.T. accel time 0-100 kph 21.4 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 4/01/77 Sequence KES-5 20° reduction of cut angle

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1000	----	2.92	3.68	13.4	10.	74,800
20	2	5300	0.44	4.56	7.83	6.4	18.	38,000
30	4	4250	0.97	6.15	7.78	4.8	19.	33,200
40	5	4700	1.81	8.83	6.50	4.2	15.	37,200
50	5	5900	2.98	11.12	5.30	3.9	14.	47,900
Idle	N	1000	----	3.21	3.55	12.3	11.	84,800

Notes: cut angle reduced by 20° - 10° per edge; crank angle ℄ same as stock
max. head temp approx. 220°C @ 50 mph
max. gas temp. @ 50 mph 680°C @ station # 2; maxgas temp @ 40 mph =610°C
at station # 1
intake - open later
- closes earlier
WOT accel time 0-100 kph = 19.4 sec.
shift @ 7000 rpm
WOT accel time 0-100 kph = 27.2 sec
shift @ 7500 rpm

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 4/15/77 Sequence KES-6 10° reduction of I. C.

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1050	----	4.44	4.35	10.5	13.	120,000
20	2	5250	0.42	5.78	7.92	5.3	17.	46,400
30	4	4200	0.93	5.88	8.98	3.8	20.	33,500
40	5	4700	1.80	8.19	8.03	3.0	23.	32,700
50	5	5900	2.83	10.58	7.00	3.4	19.	44,000
Idle	N	1100	----	4.22	5.07	9.5	15.	110,000

Notes: Cut angle reduced by 10° so that intake closes 10° earlier than stock
max. head temp.approx. 205°C @ 50 mph
max. gas temp @ 50 mph = 665°C at stat. # 2; max. gas temp @ 40 mph = 600°C
at stat. # 1
intake - open. stock
- closes earlier
WOT accel time 0-100 kph = 18.2 sec
shift at 7000 rpm
WOT accel time 0-100 kph = 18.0 sec
shift at 7500 rpm

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 5/5/77 Sequence KES-7 Return - Stock Valve

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1050	----	4.22	4.68	10.5	14.	124,000
20	2	5400	0.50	5.63	7.77	5.3	20.	52,000
30	4	4200	1.01	6.22	8.49	4.0	22.	42,000
40	5	4300	1.82	8.66	7.74	3.2	19.	38,800
50	5	6000	3.00	10.64	6.25	3.3	18.	47,200
Idle	N	1100	----	4.22	5.07	9.6	17.	117,000

Notes: Stock Rotary Valve - new spark plugs
Max. head temp. at 50 mph approx. 210°C
Max. gas temp. at 50 mph, station #2, 660°C; station #1 610°C
WOT accel. time 0 - 100 kph = 17.6 sec; shift at 7500 rpm
WOT accel. time 0 - 100 kph = 19.2 sec; shift at 7000 rpm

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 5/11/77 Sequence KES-8 Lean

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	1050	----	3.08	6.17	9.3	14.	94,400
20	2	5200	0.41	1.38	11.79	3.8	25.	25,200
30	3	4250	0.97	0.50	12.42	3.6	31.	21,600
40	5	4700	1.79	0.10	11.95	4.6	172.	19,000
50	5	5900	2.83	1.46	12.26	3.4	570.	18,800
Idle	N	1050	----	3.53	5.98	9.3	17.	98,400

Notes: Stock rotary valve - jet needle clip position changed from 3 to 1
Pilot air screw changed from 1-1/4 turn out to 2 turn out
Max. head temp. 225°C at 50 mph
Max. gas temp. at 50 mph, station #2 715°C; station #1 680°C
WOT accel. time 0 - 100 kph = 17.0 sec; shift at 7500 rpm
WOT accel. time 0 - 100 kph = 18.7 sec; shift at 7000 rpm

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 6/9/77 Sequence KES-9

Condition				Concentrations					Head Temp. °C	Back Pressure in H_2O
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C		
Idle	N	1100	----	2.00	13.91	1.2	0.9	13,280	---	0.8
20	2	5400	0.47	1.18	15.15	0.1	0.6	4,080	75	6.6
30	4	4300	1.00	0.62	15.23	0.2	0.3	2,400	150	7.6
40	5	4700	1.81	1.38	14.73	1.3	725.	184	220	18.6
50	5	5900	2.77	12.16+	8.88	0.0	1.6	7,320	190	36.0+
Idle	N	1250	----	2.79	14.46	0.8	1.5	8,240	120	0.8

Notes: Stock rotary valve, lean carburetor, 2 cat. in series
50 mph steady-state was actually 49 mph with W.O.T.
Max. catalyst exit temp. 920°C (1st cat.), 840°C (2nd cat) at 50 mph max. speed
W.O.T. accel - not taken
1 FTP conducted - FET not conducted because of performance limitation
2nd catalyst removed to reduce back-pressure-preliminary runs could not be carried out because of 1st catalyst exit temp. exceeded 950°C; 1st cat removed - 1-1/2" of substrate removed.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 6/27/77 Sequence KES-10

Conditon				Concentrations					Head Temp. °C	Back Pressure in H_2O
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C		
Idle	N	1000	----	2.16	10.77	4.4	0.5	11,000	80	0.6
20	2	5400	0.43	1.43	13.62	1.0	4.7	6,400	165	5.0
30	4	4300	0.98	1.49	13.78	0.5	---	7,200	185	6.0
40	5	4700	1.80	0.06	14.13	0.8	700.	840	260	14.0
									shut down because of hig	
									head temp. at 40 mph	

Notes: Stock rotary valve, lean carburetor, 2 cat. in series - 1st cat. substrate reduced 1-1/2"
Values based on 0 air injection - air injection between catalyst caused misfiring at 20 mph
Max. catalyst exit temp. 670°C (1st cat), 660°C (2nd cat) at 40 mph

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 6/29/77 Sequence KES-11

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Back Pressure, in H_2O
Idle	N	1050	----	2.90	12.30	2.1	2.4	18,800	0.6
20	2	5300	0.41	1.24	14.40	0.4	9.0	9,040	2.6
30	4	4300	1.00	0.88	14.46	0.5	15.	5,600	5.6
40	5	4700	1.80	0.03	13.68	2.2	560.	5,440	12.0
50	5	5900	2.87	5.92	10.88	1.0	85.	16,640	34.0
Idle	N	1100	----	2.39	13.09	1.8	2.2	16,600	0.4

Notes: Carburetor set lean: clip position number 1 pilot airscrew 2 turns out
Modified catalyst No. PTX 31.4 (NGK)
Engine misses at 20 mph in 2nd gear, maximum speed 53.1 mph at 6100 rpm
Max. head temp. of 250°C reached at 40 mph
Max. catalyst exit temp. 900°C at 50 mph with 2.4 cfm air added in front of catalyst

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 6/29/77 Sequence KES-12

Conditon				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Air Injection Rates, Pump No. 0533, cfm
Idle	N	1000	----	1.18	14.10	1.1	2.5	5,320	0.21
20	2	5300	0.40	0.02	13.36	3.0	25.	1,300	1.01
30	4	4350	0.92	0.06	13.65	2.3	51.	2,800	0.84
40	5	4700	1.79	0.03	12.99	3.7	495.	5,360	0.90
50	5	5900	2.81	5.13	11.44	1.0	78.	12,800	1.11
Idle	N	1100	----	0.73	14.70	0.8	2.7	3,080	0.21

Notes: Conditions same as KES-11 but air injected by pump
Max. head temp. 225°C at 50 mph
Max. cat. exit temp. 875°C at 50 mph
W.O.T. 0-80 kph acceleration time 23.1 sec.

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KE-175

Date 7/27/77 Sequence KES-13

Condition				Concentrations					Temperature, °C		Air Inject. cfm
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO$_2$, %	O$_2$, %	NO, ppm	FID HC, ppm C	Enter Cat.	Exit Cat.	
Idle	N	1100	--	0.08	12.65	4.1	11.	2,760	250	570	0.36
20	2	5300	0.46	0.03	11.72	5.5	18.	1,330	300	500	1.64
30	4	4350	1.00	0.05	12.55	4.3	34.	2,680	340	500	1.40
40	5	4600	1.83	0.02	11.93	5.5	365.	5,180	420	580	1.38
50	5	5900	2.95	4.12	12.26	1.3	105.	9,680	570	900	1.62
Idle	N	1100	--	0.09	13.62	2.9	13.	1,940	300	650	0.37

Notes: Carburetor lean + modified catalyst + air injection by pump No. 1033 at 1:1
Max. head temp 215°C at 50 mph
W.O.T. accel time 0-80 kph 22.7 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE ____________

Date ____________ Sequence ____________

Conditon				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO$_2$, %	O$_2$, %	NO, ppm	FID HC, ppm C	

Notes: ____________

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                         TABLE                         VEHICLE EMISSION RESULTS
                                                 1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  300          TEST NO. 1           DATE 10/12/76
VEHICLE MODEL  KAWASAKI KE 175               ENGINE     .17 LITRE 1          MFGR. CODE   -0                  YR.  1976
                                                                          CURB WT.      0 KG                 GVW      0 KG

BAROMETER 744.47 MM OF HG.
DRY BULB TEMP.    26.1 DEG. C                                             WET BULB TEMP  20.6 DEG. C
REL. HUMIDITY      60 PCT.                                                AHS. HUMIDITY  14.1 GRAMS/KG
                                                                          DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

     BLOWER DIF. PRESS., G2, 137.2 MM. H2O                                BLOWER INLET PRESS., G1 121.9 MM. H2O
     BAG RESULTS                                                          BLOWER INLET TEMP.    43 DEG. C
     BAG NO.                                      1               2               3
     BLOWER REVOLUTIONS                        3184            5468            3183
     ROLL COUNTS                               3424            3732            3453
     HC   SAMPLE  METER READING/SCALE         32.9/4          18.5/4          33.4/4
     HC   SAMPLE  PPM                         3290            1850            3340
     HC   BACKGRD METER READING/SCALE          2.1/3           2.6/3           2.1/3
     HC   BACKGRD PPM                            21              26              21
     CO   SAMPLE  METER READING/SCALE         91.6/2          52.7/2          97.7/2
     CO   SAMPLE  PPM                         5787            2587            6322
     CO   BACKGRD METER READING/SCALE           .5/2            .1/2            .1/2
     CO   BACKGRD PPM                            19               4               4
     CO2  SAMPLE  METER READING/SCALE         31.1/3          19.5/3          27.7/3
     CO2  SAMPLE  PERCENT                       .52             .31             .45
     CO2  BACKGRD METER READING/SCALE          1.7/3           1.4/3            .8/3
     CO2  BACKGRD PERCENT                       .03             .02             .01
     NOX  SAMPLE  METER READING/SCALE          3.4/2           1.9/2           3.2/2
     NOX  SAMPLE  PPM                          3.4             1.9             3.2
     NOX  BACKGRD METER READING/SCALE          1.5/2            .9/2           1.0/2
     NOX  BACKGRD PPM                          1.5              .9             1.0
     SO2  SAMPLE  METER READING/SCALE        -0.0/*          -0.0/*          -0.0/*
     SO2  SAMPLE  PPM                          0.0             0.0             0.0
     SO2  BACKGRD METER READING/SCALE        -0.0/*          -0.0/*          -0.0/*
     SO2  BACKGRD PPM                          0.0             0.0             0.0

     HC   CONCENTRATION PPM                   3271            1825            3321
     CO   CONCENTRATION PPM                   5600            2517            6140
     CO2  CONCENTRATION PCT                    .49             .29             .44
     NOX  CONCENTRATION PPM                    2.1             1.1             2.3
     SO2  CONCENTRATION PPM                    0.0             0.0             0.0
     HC   MASS GRAMS                          45.11           43.23           45.78
     CO   MASS GRAMS                         155.93          120.36          170.89
     CO2  MASS GRAMS                         216.39          221.27          195.17
     NOX  MASS GRAMS                            .10             .09             .11
     SO2  MASS GRAMS                           0.00            0.00            0.00
     TOTAL CARBON GRAMS                      164.97          149.42          166.18

     WEIGHTED MASS HC       7.44 GRAMS/KILOMETRE
     WEIGHTED MASS CO      23.89 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     35.69 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .02 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       11.92 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  29.4  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST              480.56 GRAMS
     ESTIMATED FUEL WEIGHT =   .56KG.
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     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMBER 300

DATE 10/13/76               TIME     -0 HRS.          TEST NO.  1
MODEL  1976 KAWASAKI KE175 HIWAY CYCLE                ENGINE  .2 LITRE  1
DRIVER   TJ                 TEST WT.     0 KG.        GVW    0 KG
WET BULB TEMP  19 C         DRY BULB TEMP  27 C       REL. HUM.  50.8 PCT
SPEC. HUM.  11.3 GRAM/KG    BARO.  745.2 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.   457.2  MM. H2O
  BLOWER DIF.  PRESS.   482.6  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9909
  DISTANCE TRAVELED     16.47  KILOMETRES
  BLOWER REVOLUTIONS       9479
  BLOWER CU. CM /REV.   8101

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE             27.1/4
   HC   SAMPLE  PPM                             2710
   HC   BACKGRD METER READING/SCALE              3.1/3
   HC   BACKGRD PPM                               31
   CO   SAMPLE  METER READING/SCALE             69.4/1
   CO   SAMPLE  PPM                             7374
   CO   BACKGRD METER READING/SCALE               .3/1
   CO   BACKGRD PPM                               16
   CO2 SAMPLE  METER READING/SCALE              29.7/3
   CO2 SAMPLE  PERCENT                            .49
   CO2 BACKGRD METER READING/SCALE               3.9/3
   CO2 BACKGRD PERCENT                            .06
   NOX SAMPLE  METER READING/SCALE               4.5/2
   NOX SAMPLE  PPM                               4.5
   NOX BACKGRD METER READING/SCALE                .5/2
   NOX BACKGRD PPM                                .5
   HC   CONCENTRATION PPM                       2682
   CO   CONCENTRATION PPM                       7170
   CO2 CONCENTRATION PCT                          .44
   NOX CONCENTRATION PPM                         4.1
   SO2 COCENTRATION PPM                         0.0
   HC   MASS (GRAMS)                          103.02
   CO   MASS (GRAMS)                          555.96
   CO2 MASS (GRAMS)                           535.27
   NOX MASS (GRAMS)                              .53
   SO2 MASS (GRAMS)                             0.00

 HC   GRAMS/KILOMETRE      6.25
 CO   GRAMS/KILOMETRE     33.75
 CO2 GRAMS/KILOMETRE      32.50
 NOX GRAMS/KILOMETRE        .03
 SO2 GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  48.16    HC   GRAMS/MIN   8.07
 CO   GRAMS/KG OF FUEL  415.4    CO   GRAMS/MIN  43.6
 CO2 GRAMS/KG OF FUEL     978    CO2 GRAMS/MIN    42
 NOX GRAMS/KG OF FUEL     .96    NOX GRAMS/MIN    .04
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                  22.10  KILOMETRES/LITRE
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                  TABLE                     VEHICLE EMISSION RESULTS
                                         1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  300       TEST NO. 2          DATE 10/13/76                      MFGR. CODE   -0                  YR.  1976
VEHICLE MODEL  KAWASAKI KE175           ENGINE     .18 LITRE 1             CURB WT.      0 KG               GVM      0 KG

BAROMETER 745.74 MM OF HG.
DRY BULB TEMP.    26.7 DEG. C                                              WET BULB TEMP  21.1 DEG. C
REL. HUMIDITY     61 PCT.                                                  ABS. HUMIDITY  13.6 GRAMS/KG
                                                                           DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS
                                                                           BLOWER INLET PRESS., G1 127.0 MM. H2O
    BLOWER DIF. PRESS., G2, 132.1 MM. H2O                                  BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                      1              2              3
    BLOWER REVOLUTIONS                         3188           5963           3178
    ROLL COUNTS                                 3484           3729           3466
    HC   SAMPLE  METER READING/SCALE           32.6/4         18.8/4         34.3/4
    HC   SAMPLE  PPM                           3260           1880           3430
    HC   BACKGRD METER READING/SCALE            3.8/3          3.6/3          3.1/3
    HC   BACKGRD PPM                             38             36             31
    CO   SAMPLE  METER READING/SCALE           93.7/2         53.2/2         99.8/2
    CO   SAMPLE  PPM                           5974           2621           6499
    CO   BACKGRD METER READING/SCALE            .1/2           .1/2           .1/2
    CO   BACKGRD PPM                             4              4              4
    CO2  SAMPLE  METER READING/SCALE           33.9/3         20.8/3         30.0/3
    CO2  SAMPLE  PERCENT                        .57            .34            .50
    CO2  BACKGRD METER READING/SCALE            3.4/3          3.0/3          2.9/3
    CO2  BACKGRD PERCENT                        .05            .05            .04
    NOX  SAMPLE  METER READING/SCALE            3.8/2          2.3/2          3.9/2
    NOX  SAMPLE  PPM                            3.8            2.3            3.9
    NOX  BACKGRD METER READING/SCALE            .9/2           1.0/2          1.1/2
    NOX  BACKGRD PPM                            .9             1.0            1.1
    SO2  SAMPLE  METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                           0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                           0.0            0.0            0.0

    HC   CONCENTRATION PPM                     3226           1846           3402
    CO   CONCENTRATION PPM                     5788           2549           6306
    CO2  CONCENTRATION PCT                      .52            .29            .46
    NOX  CONCENTRATION PPM                     3.0            1.4            2.9
    SO2  CONCENTRATION PPM                     0.0            0.0            0.0
    HC   MASS GRAMS                           44.76          43.89          47.05
    CO   MASS GRAMS                          162.13         122.33         176.05
    CO2  MASS GRAMS                          229.75         221.34         201.13
    NOX  MASS GRAMS                             .15            .12            .15
    SO2  MASS GRAMS                            0.00           0.00           0.00
    TOTAL CARBON GRAMS                       170.97         150.85         171.11

    WEIGHTED MASS HC       7.51 GRAMS/KILOMETRE
    WEIGHTED MASS CO      24.42 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     36.31 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .02 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        11.97 KILOMETRE

    FUEL ECONOMY BY CARRON BALANCE =  24.0  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST             492.93 GRAMS
    ESTIMATED FUEL WEIGHT =   .57KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMBER 300

DATE 10/13/75              TIME      -0 HRS.         TEST NO.  2
MODEL  1976 KAWASAKI KE175 HIWAY CYCLE               ENGINE  .2 LITRE  1
DRIVER   TJ                TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  19 C        DRY BULB TEMP  27 C       REL. HUM.  50.8 PCT
SPEC. HUM.  11.3 GRAM/KG   BARO.  745.2 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION          12.78 MINUTES
  BLOWER INLET PRESS.  457.2  MM. H20
  BLOWER DIF.  PRESS.  482.6  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9912
  DISTANCE TRAVELED   16.48  KILOMETRES
  BLOWER REVOLUTIONS      9498
  BLOWER CU. CM /REV.  8101

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE               29.0/4
   HC  SAMPLE  PPM                               2900
   HC  BACKGRD METER READING/SCALE                3.1/3
   HC  BACKGRD PPM                                 31
   CO  SAMPLF  METER READING/SCALE               71.5/1
   CO  SAMPLE  PPM                               7785
   CO  BACKGRD METER READING/SCALE                 .1/1
   CO  BACKGRD PPM                                  5
   CO2 SAMPLE  METER READING/SCALE               30.7/3
   CO2 SAMPLE  PERCENT                            .51
   CO2 BACKGRD METER READING/SCALE                3.4/3
   CO2 BACKGRD PERCENT                            .05
   NOX SAMPLE  METER READING/SCALE                4.3/2
   NOX SAMPLE  PPM                                4.3
   NOX BACKGRD METER READING/SCALE                1.0/2
   NOX BACKGRD PPM                                1.0
   HC  CONCENTRATION PPM                         2873
   CO  CONCENTRATION PPM                         7577
   CO2 CONCENTRATION PCT                          .46
   NOX CONCENTRATION PPM                          3.4
   SO2 COCENTRATION PPM                          0.0
   HC  MASS (GRAMS)                            110.55
   CO  MASS (GRAMS)                            588.73
   CO2 MASS (GRAMS)                            567.07
   NOX MASS (GRAMS)                               .44
   SO2 MASS (GRAMS)                              0.00

 HC  GRAMS/KILOMETRE      6.71
 CO  GRAMS/KILOMETRE     35.73
 CO2 GRAMS/KILOMETRE     34.42
 NOX GRAMS/KILOMETRE       .03
 SO2 GRAMS/KILOMETRE      0.00

 HC  GRAMS/KG OF FUEL  *0.17     HC  GRAMS/MIN   8.65
 CO  GRAMS/KG OF FUEL  *12.7     CO  GRAMS/MIN   46.1
 CO2 GRAMS/KG OF FUEL    975     CO2 GRAMS/MIN     44
 NOX GRAMS/KG OF FUEL    .76     NOX GRAMS/MIN    .03
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                    20.82  KILOMETRES/LITRE
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                        TABLE                                VEHICLE EMISSION RESULTS
                                                      1975  LIGHT DUTY EMISSIONS TEST
                                         DATE  4/ 4/77                      MFGR. CODE    -0                    YR.  1976
UNIT NO.  300        TEST NO. *          ENGINE    .18 LITRE 1              CURR WT.      0 KG                  GVM      0 KG
VEHICLE MODEL  KE-175 20° REDUCTION
                                                                      WET BULB TEMP  11.1 DEG. C
BAROMETER 737.87 MM OF HG.                                            ABS. HUMIDITY   3.3 GRAMS/KG
DRY BULB TEMP.    23.3 DEG. C                                         DYNO ROLL CONSTANT   967.97
REL. HUMIDITY      18 PCT.

EXHAUST EMISSIONS                                                     BLOWER INLET PRESS., G1 127.0 MM. H2O
                                                                      BLOWER INLET TEMP.    43 DEG. C
     BLOWER DIF'. PRESS., G2, 152.4 MM. H2O
     BAG RESULTS
     BAG NO.                                      1              2              3
     BLOWER REVOLUTIONS                        3176           5430           3198
     ROLL COUNTS                                3480           3770           3473
     HC    SAMPLE   METER READING/SCALE        31.4/4         17.7/4         33.5/4
     HC    SAMPLE   PPM                        3190           1770           3350
     HC    BACKGRD METER READING/SCALE          .3/4           .4/4           .2/4
     HC    BACKGRD PPM                           30             40             20
     CO    SAMPLE   METER READING/SCALE        95.2/2         52.3/2         66.6/1
     CO    SAMPLE   PPM                        6106           2560           6858
     CO    BACKGRD METER READING/SCALE          .1/2           .2/2           .1/2
     CO    BACKGRD PPM                            4              8              4
     CO2   SAMPLE   METER READING/SCALE        32.0/3         21.3/3         29.4/3
     CO2   SAMPLE   PERCENT                     .53            .34            .48
     CO2   BACKGRD METER READING/SCALE         3.3/3          3.8/3          3.6/3
     CO2   BACKGRD PERCENT                      .05            .06            .06
     NOX   SAMPLE   METER READING/SCALE         4.1/2          2.4/2          4.4/2
     NOX   SAMPLE   PPM                         4.1            2.4            4.4
     NOX   BACKGRD METER READING/SCALE         1.0/2          1.0/2          1.1/2
     NOX   BACKGRD PPM                          1.0            1.0            1.1
     SO2   SAMPLE   METER READING/SCALE        -0.0/*         -0.0/*         -0.0/*
     SO2   SAMPLE   PPM                         0.0            0.0            0.0
     SO2   BACKGRD METER READING/SCALE         -0.0/*         -0.0/*         -0.0/*
     SO2   BACKGRD PPM                          0.0            0.0            0.0

     HC    CONCENTRATION PPM                   3113           1732           3332
     CO    CONCENTRATION PPM                   6005           2521           6750
     CO2   CONCENTRATION PCT                    .49            .29            .49
     NOX   CONCENTRATION PPM                    3.2            1.5            3.4
     SO2   CONCENTRATION PPM                    0.0            0.0            0.0
     HC    MASS GRAMS                         41.95          39.89          45.23
     CO    MASS GRAMS                        163.36         117.22         184.98
     CO2   MASS GRAMS                        208.97         212.11         188.67
     NOX   MASS GRAMS                           .12            .09            .12
     SO2   MASS GRAMS                          0.00           0.00           0.00
     TOTAL CARBON GRAMS                      163.40         142.69         169.96

     WEIGHTED MASS HC        6.95 GRAMS/KILOMETRE
     WEIGHTED MASS CO       24.32 GRAMS/KILOMETRE
     WEIGHTED MASS CO2      34.00 GRAMS/KILOMETRE
     WEIGHTED MASS NOX        .02 GRAMS/KILOMETRE
     WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE        12.05 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  25.1  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST              476.05 GRAMS
     ESTIMATED FUEL WEIGHT =    .55KG.
     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMBER 300

DATE  4/ 4/77                 TIME    -0 HRS.           TEST NO.  1
MODEL  1976 KAWASAKI KE-175 FET  20" REDUCTION          ENGINE  .2 LITRE  1
DRIVER   KN                   TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  11 C           DRY BULB TEMP  23 C       REL. HUM.  15.2 PCT
SPEC. HUM.   2.8 GRAM/KG      BARO.  737.4 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.   127.0  MM. H20
  BLOWER DIF.  PRESS.   152.4  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       4895
  DISTANCE TRAVELED    16.45  KILOMETRES
  BLOWER REVOLUTIONS      4808
  BLOWER CU. CM /REV.  8287

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                    63.1/4
   HC   SAMPLE  PPM                                    6310
   HC   BACKGRD METER READING/SCALE                      .6/4
   HC   BACKGRD PPM                                      60
   CO   SAMPLE  METER READING/SCALE                    44.4/1
   CO   SAMPLE  PPM                                   17310
   CO   BACKGRD METER READING/SCALE                     2.6/3
   CO   BACKGRD PPM                                      56
   CO2  SAMPLE  METER READING/SCALE                    48.7/3
   CO2  SAMPLE  PERCENT                                 .84
   CO2  BACKGRD METER READING/SCALE                      .7/2
   CO2  BACKGRD PERCENT                                 .03
   NOX  SAMPLE  METER READING/SCALE                     8.2/2
   NOX  SAMPLE  PPM                                     8.2
   NOX  BACKGRD METER READING/SCALE                      .7/2
   NOX  BACKGRD PPM                                      .7
   HC   CONCENTRATION PPM                              6264
   CO   CONCENTRATION PPM                             16910
   CO2  CONCENTRATION PCT                               .82
   NOX  CONCENTRATION PPM                               7.7
   SO2  COCENTRATION PPM                               0.0
   HC   MASS (GRAMS)                                 127.73
   CO   MASS (GRAMS)                                 696.12
   CO2  MASS (GRAMS)                                 535.00
   NOX  MASS (GRAMS)                                    .41
   SO2  MASS (GRAMS)                                   0.00

HC   GRAMS/KILOMETRE      7.77
CO   GRAMS/KILOMETRE     42.32
CO2  GRAMS/KILOMETRE     32.53
NOX  GRAMS/KILOMETRE       .02
SO2  GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL   *9.06     HC   GRAMS/MIN   10.01
CO   GRAMS/KG OF FUEL  *84.9      CO   GRAMS/MIN    54.5
CO2  GRAMS/KG OF FUEL    834      CO2  GRAMS/MIN     42
NOX  GRAMS/KG OF FUEL    .64      NOX  GRAMS/MIN    .03
SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                     18.83  KILOMETRES/LITRE
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                                TABLE                              VEHICLE EMISSION RESULTS
                                                             1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  300        TEST NO. 1             DATE  4/18/77                       MFGR. CODE    -0                       YR.  1976
VEHICLE MODEL  KE-175 10% REDUCTION         ENGINE    .18 LITRE 1               CURB WT.      0 KG                     GVM      0 KG

BAROMETER 739.90 MM OF HG.                                                      WET BULB TEMP  17.2 DEG. C
DRY BULB TEMP.    23.9 DEG. C                                                   ABS. HUMIDITY    9.7 GRAMS/KG
REL. HUMIDITY      51 PCT.                                                      DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                                BLOWER INLET PRESS., G1 127.0 MM. H2O
    BLOWER DIF. PRESS., G2, 152.4 MM. H2O                                       BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                        1                 2                  3
    BLOWER REVOLUTIONS                          3161              5457               3203
    ROLL COUNTS                                  3510              3795               3520
    HC    SAMPLE  METER READING/SCALE           32.3/4            18.7/4             33.3/4
    HC    SAMPLE  PPM                           3230              1870               3330
    HC    BACKGRD METER READING/SCALE            .1/4              .5/4               .5/4
    HC    BACKGRD PPM                             10                50                 50
    CO    SAMPLE  METER READING/SCALE           97.9/2            53.6/2             67.1/1
    CO    SAMPLE  PPM                           6339              2648               6947
    CO    BACKGRD METER READING/SCALE            .4/2              .5/2               .4/2
    CO    BACKGRD PPM                             15                19                 15
    CO2   SAMPLE  METER READING/SCALE           34.6/3            22.6/3             31.5/3
    CO2   SAMPLE  PERCENT                        .58               .37                .52
    CO2   BACKGRD METER READING/SCALE           3.8/3             4.1/3              4.2/3
    CO2   BACKGRD PERCENT                        .06               .06                .06
    NOX   SAMPLE  METER READING/SCALE           3.1/2             1.7/2              2.8/2
    NOX   SAMPLE  PPM                           3.1               1.7                2.8
    NOX   BACKGRD METER READING/SCALE            .7/2              .6/2               .5/2
    NOX   BACKGRD PPM                             .7                .6                 .5
    SO2   SAMPLE  METER READING/SCALE          -0.0/*            -0.0/*             -0.0/*
    SO2   SAMPLE  PPM                            0.0               0.0                0.0
    SO2   BACKGRD METER READING/SCALE          -0.0/*            -0.0/*             -0.0/*
    SO2   BACKGRD PPM                            0.0               0.0                0.0

    HC    CONCENTRATION PPM                     3221              1823               3286
    CO    CONCENTRATION PPM                     6150              2568               6749
    CO2   CONCENTRATION PCT                      .53               .31                .47
    NOX   CONCENTRATION PPM                      2.5               1.1                2.4
    SO2   CONCENTRATION PPM                      0.0               0.0                0.0
    HC    MASS GRAMS                           43.32             42.34              44.80
    CO    MASS GRAMS                          166.99            120.41             185.77
    CO2   MASS GRAMS                          225.87            227.32             202.29
    NOX   MASS GRAMS                             .11               .06                .10
    SO2   MASS GRAMS                            0.00              0.00               0.00
    TOTAL CARBON GRAMS                        170.75            150.33             173.65

    WEIGHTED MASS HC       7.12 GRAMS/KILOMETRE
    WEIGHTED MASS CO      24.53 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     36.19 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .02 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.15 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  24.3  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              494.72 GRAMS
    ESTIMATED FUEL WEIGHT =   .57KG.
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       TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 300

DATE  4/18/77                    TIME     -0 HRS.        TEST NO.  1
MODEL  1976 KAWASAKI KE-175 FET 10° REDUCTION            ENGINE  .2 LITRE  6
DRIVER   KN                      TEST WT.     0 KG.      GVW    0 KG
WET BULB TEMP  17 C              DRY BULB TEMP  24 C     REL. HUM.  47.8 PCT
SPEC. HUM.   4.1 GRAM/KG         BARO.  739.6 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION            12.77 MINUTES
  BLOWER INLET PRESS.  127.0  MM. H20
  BLOWER DIF.  PRESS.  152.4  MM  H20
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS      9950
  DISTANCE TRAVELED   16.54  KILOMETRES
  BLOWER REVOLUTIONS     4809
  BLOWER CU. CM /REV.  8259

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE              56.7/4
   HC  SAMPLE  PPM                              5670
   HC  BACKGRD METER READING/SCALE                .9/4
   HC  BACKGRD PPM                                90
   CO  SAMPLE  METER READING/SCALE              97.0/1
   CO  SAMPLE  PPM                             15742
   CO  BACKGRD METER READING/SCALE               .2/1
   CO  BACKGRD PPM                                11
   CO2 SAMPLE  METER READING/SCALE              54.3/3
   CO2 SAMPLE  PERCENT                           .95
   CO2 BACKGRD METER READING/SCALE              4.3/3
   CO2 BACKGRD PERCENT                           .07
   NOX SAMPLE  METER READING/SCALE              6.1/2
   NOX SAMPLE  PPM                              6.1
   NOX BACKGRD METER READING/SCALE               .8/2
   NOX BACKGRD PPM                               .8
   HC  CONCENTRATION PPM                        5600
   CO  CONCENTRATION PPM                       15202
   CO2 CONCENTRATION PCT                         .90
   NOX CONCENTRATION PPM                        5.5
   SO2 COCENTRATION PPM                        0.0
   HC  MASS (GRAMS)                           119.60
   CO  MASS (GRAMS)                           628.06
   CO2 MASS (GRAMS)                           586.91
   NOX MASS (GRAMS)                              .35
   SO2 MASS (GRAMS)                             0.00

 HC  GRAMS/KILOMETRE     6.93
 CO  GRAMS/KILOMETRE    37.97
 CO2 GRAMS/KILOMETRE    35.49
 NOX GRAMS/KILOMETRE      .02
 SO2 GRAMS/KILOMETRE     0.00

 HC  GRAMS/KG OF FUEL  *7.52     HC  GRAMS/MIN    8.97
 CO  GRAMS/KG OF FUEL  *27.7     CO  GRAMS/MIN   49.2
 CO2 GRAMS/KG OF FUEL    960     CO2 GRAMS/MIN     46
 NOX GRAMS/KG OF FUEL    .58     NOX GRAMS/MIN    .03
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                  19.88  KILOMETRES/LITRE
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                       TABLE                        VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO. 300        TEST NO. 1          DATE  5/12/77                         MFGR. CODE    -0                 YR. 1976
VEHICLE MODEL  KE-175 LEAN+ST.VL        ENGINE     .18 LITRE 1                CURB WT.      0 KG               GVM      0 KG

BAROMETER 743,97 MM OF HG,                                                    WET BULB TEMP  17.8 DEG. C
DRY BULB TEMP.    25.0 DEG. C                                                 ABS. HUMIDITY   9.9 GRAMS/KG
REL. HUMIDITY       49 PCT.                                                   DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                              BLOWER INLET PRESS., G1 127.0 MM. H2O
     BLOWER DIF. PRESS., G2, 152.4 MM. H2O                                    BLOWER INLET TEMP.    43 DEG. C
     BAG RESULTS
     BAG NO.                                       1              2              3
     BLOWER REVOLUTIONS                         3184           5448           3186
     ROLL COUNTS                                 3502           3791           3521
     HC   SAMPLE  METER READING/SCALE          25.0/4         11.1/4         21.1/4
     HC   SAMPLE  PPM                          2500           1110           2110
     HC   BACKGRD METER READING/SCALE            .6/4           .6/4           .4/4
     HC   BACKGRD PPM                            60             60             40
     CO   SAMPLE  METER READING/SCALE          58.6/3         81.7/*         71.0/3
     CO   SAMPLE  PPM                          1473            376           1853
     CO   BACKGRD METER READING/SCALE            .1/3           .2/3           .8/*
     CO   BACKGRD PPM                             2              4              2
     CO2  SAMPLE  METER READING/SCALE          42.9/3         26.9/3         39.9/3
     CO2  SAMPLE  PERCENT                        .72            .43            .68
     CO2  BACKGRD METER READING/SCALE           3.0/3          3.5/3          2.9/3
     CO2  BACKGRD PERCENT                        .05            .05            .04
     NOX  SAMPLE  METER READING/SCALE          10.0/2          3.0/2          9.3/2
     NOX  SAMPLE  PPM                          10.0            3.0            9.3
     NOX  BACKGRD METER READING/SCALE            .8/2           .8/2           .8/2
     NOX  BACKGRD PPM                            .8             .8             .8
     SO2  SAMPLE  METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
     SO2  SAMPLE  PPM                           0.0            0.0            0.0
     SO2  BACKGRD METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
     SO2  BACKGRD PPM                           0.0            0.0            0.0

     HC   CONCENTRATION PPM                    2445           1053           2073
     CO   CONCENTRATION PPM                    1427            363           1798
     CO2  CONCENTRATION PCT                     .68            .38            .64
     NOX  CONCENTRATION PPM                     9.3            2.2            8.6
     SO2  CONCENTRATION PPM                     0.0            0.0            0.0
     HC   MASS GRAMS                          33.34          24.56          28.29
     CO   MASS GRAMS                          39.29          17.09          49.53
     CO2  MASS GRAMS                         295.88         283.27         276.30
     NOX  MASS GRAMS                            .41            .17            .38
     SO2  MASS GRAMS                           0.00           0.00           0.00
     TOTAL CARBON GRAMS                      126.46         105.90         121.13

     WEIGHTED MASS HC      4.53 GRAMS/KILOMETRE
     WEIGHTED MASS CO      5.12 GRAMS/KILOMETRE
     WEIGHTED MASS CO2    46.78 GRAMS/KILOMETRE
     WEIGHTED MASS NOX      .05 GRAMS/KILOMETRE
     WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       12.14 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  34.0  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST              353.49 GRAMS
     ESTIMATED FUEL WEIGHT =   .41KG.
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          TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                                 VEHICLE NUMBER 300

DATE  5/12/77                  TIME     -0 HRS.          TEST NO.  1
MODEL  1976 KAWASAKI KE-175 FET LEAN+ST. VL              ENGINE  .2 LITRE  1
DRIVER   KN                    TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  19 C            DRY BULB TEMP  27 C       REL. HUM.  50.8 PCT
SPEC. HUM.  11.3 GRAM/KG       BARO.  744.0 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION            12.79 MINUTES
  BLOWER INLET PRESS,    127,0   MM, H2O
  BLOWER DIF.  PRESS.    152.4   MM  H2O
  BLOWER INLET TEMP.        43  DEG. C
  DYNO REVOLUTIONS        9931
  DISTANCE TRAVELED      16.51  KILOMETRES
  BLOWER REVOLUTIONS       4818
  BLOWER CU. CM /REV.    8294

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                   35.1/4
   HC   SAMPLE  PPM                                   3510
   HC   BACKGRD METER READING/SCALE                     .4/4
   HC   BACKGRD PPM                                     40
   CO   SAMPLE  METER READING/SCALE                   84.9/2
   CO   SAMPLE  PPM                                   5183
   CO   BACKGRD METER READING/SCALE                     .2/2
   CO   BACKGRD PPM                                      8
   CO2  SAMPLE  METER READING/SCALE                   69.6/3
   CO2  SAMPLE  PERCENT                               1.26
   CO2  BACKGRD METER READING/SCALE                    3.4/3
   CO2  BACKGRD PERCENT                                .05
   NOX  SAMPLE  METER READING/SCALE                   23.8/2
   NOX  SAMPLE  PPM                                   23.8
   NOX  BACKGRD METER READING/SCALE                    1.4/2
   NOX  BACKGRD PPM                                    1.4
   HC   CONCENTRATION PPM                             3476
   CO   CONCENTRATION PPM                             4967
   CO2  CONCENTRATION PCT                             1.21
   NOX  CONCENTRATION PPM                             22.6
   SO2  COCENTRATION PPM                               0.0
   HC   MASS (GRAMS)                                 71.73
   CO   MASS (GRAMS)                                206.92
   CO2  MASS (GRAMS)                                797.55
   NOX  MASS (GRAMS)                                  1.58
   SO2  MASS (GRAMS)                                  0.00

 HC   GRAMS/KILOMETRE       4.35
 CO   GRAMS/KILOMETRE      12.53
 CO2  GRAMS/KILOMETRE      48.31
 NOX  GRAMS/KILOMETRE        .10
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL   48.90        HC   GRAMS/MIN    5.61
 CO   GRAMS/KG OF FUEL   485.8        CO   GRAMS/MIN    16.2
 CO2  GRAMS/KG OF FUEL    1872        CO2  GRAMS/MIN      62
 NOX  GRAMS/KG OF FUEL    3.71        NOX  GRAMS/MIN     .12
 SO2  GRAMS/KG OF FUEL    0.00        SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                           28.47  KILOMETRES/LITRE
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                         TABLE              VEHICLE EMISSION RESULTS
                                      1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  300        TEST NO. 2        DATE  5/13/77                     MFGR. CODE   -0                 YR.  1976
VEHICLE MODEL  KE-175 LEAN+STVL        ENGINE    .18 LITRE 1             CURB WT.      0 KG              GVM      0 KG

BAROMETER 742.95 MM OF HG.                                          WET BULB TEMP  19.9 DEG. C
DRY BULB TEMP.   25.0 DEG. C                                        ABS. HUMIDITY  12.1 GRAMS/KG
REL. HUMIDITY     60 PCT.                                           DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                    BLOWER INLET PRESS., G1 127.0 MM. H2O
    BLOWER DIF. PRESS., G2, 152.4 MM. H2O                           BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                  1              2              3
    BLOWER REVOLUTIONS                    3179           5455           3192
    ROLL COUNTS                           3998           3784           3500
    HC   SAMPLE  METER READING/SCALE     24.7/4         12.9/4         21.9/4
    HC   SAMPLE  PPM                     2470           1290           2190
    HC   BACKGRD METER READING/SCALE       .3/4           .3/4           .3/4
    HC   BACKGRD PPM                       30             30             30
    CO   SAMPLE  METER READING/SCALE     64.8/3         77.1/*         75.8/3
    CO   SAMPLE  PPM                     1657            343           2015
    CO   BACKGRD METER READING/SCALE       .1/3           .1/3           .4/1
    CO   BACKGRD PPM                        2              2             21
    CO2  SAMPLE  METER READING/SCALE     42.8/3         28.5/3         40.1/3
    CO2  SAMPLE  PERCENT                   .73            .47            .68
    CO2  BACKGRD METER READING/SCALE      3.9/3          3.6/3          2.9/3
    CO2  BACKGRD PERCENT                   .06            .06            .04
    NOX  SAMPLE  METER READING/SCALE      9.8/2          3.7/2          9.3/2
    NOX  SAMPLE  PPM                      9.8            3.7            9.3
    NOX  BACKGRD METER READING/SCALE      1.4/2           .9/2           .9/2
    NOX  BACKGRD PPM                      1.4             .9             .9
    SO2  SAMPLE  METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                      0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                      0.0            0.0            0.0

    HC   CONCENTRATION PPM               2443           1261           2162
    CO   CONCENTRATION PPM               1600            331           1931
    CO2  CONCENTRATION PCT                .68            .42            .64
    NOX  CONCENTRATION PPM                8.5            2.8            8.5
    SO2  CONCENTRATION PPM                0.0            0.0            0.0
    HC   MASS GRAMS                     33.20          29.43          29.52
    CO   MASS GRAMS                     43.92          15.61          53.22
    CO2  MASS GRAMS                    292.72         309.75         278.08
    NOX  MASS GRAMS                       .40            .23            .40
    SO2  MASS GRAMS                      0.00           0.00           0.00
    TOTAL CARBON GRAMS                 127.97         116.70         124.27

    WEIGHTED MASS HC      5.00 GRAMS/KILOMETRE
    WEIGHTED MASS CO      5.36 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    49.08 GRAMS/KILOMETRE
    WEIGHTED MASS NOX      .05 GRAMS/KILOMETRE
    WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.11 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  32.0  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST             368.94 GRAMS
    ESTIMATED FUEL WEIGHT =    .43KG.
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     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 300

DATE  5/13/77                  TIME    -0 HRS.          TEST NO.  2
MODEL  1976 KAWASAKI KE-175 FET LEAN+ST. VL              ENGINE  .2 LITRE  1
DRIVER   KN                    TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  21 C            DRY BULB TEMP  26 C      REL. HUM.  60.5 PCT
SPEC. HUM.  13.1 GRAM/KG       BARO.  741.7 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION            12.77 MINUTES
  BLOWER INLET PRESS.    127.0  MM. H2O
  BLOWER DIF.  PRESS.    152.4  MM  H2O
  BLOWER INLET TEMP.        43  DEG. C
  DYNO REVOLUTIONS        9972
  DISTANCE TRAVELED      16.58  KILOMETRES
  BLOWER REVOLUTIONS      4812
  BLOWER CU. CM /REV.    8292

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                  32.3/4
   HC   SAMPLE  PPM                                   3230
   HC   BACKGRD METER READING/SCALE                    .2/4
   HC   BACKGRD PPM                                     20
   CO   SAMPLE  METER READING/SCALE                  77.7/2
   CO   SAMPLE  PPM                                   4541
   CO   BACKGRD METER READING/SCALE                    .1/2
   CO   BACKGRD PPM                                      4
   CO2  SAMPLE  METER READING/SCALE                  70.4/3
   CO2  SAMPLE  PERCENT                               1.27
   CO2  BACKGRD METER READING/SCALE                   3.6/3
   CO2  BACKGRD PERCENT                                .06
   NOX  SAMPLE  METER READING/SCALE                  23.8/2
   NOX  SAMPLE  PPM                                   23.8
   NOX  BACKGRD METER READING/SCALE                    .8/2
   NOX  BACKGRD PPM                                     .8
   HC   CONCENTRATION PPM                             3213
   CO   CONCENTRATION PPM                             4337
   CO2  CONCENTRATION PCT                             1.23
   NOX  CONCENTRATION PPM                             23.1
   SO2  COCENTRATION PPM                               0.0
   HC   MASS (GRAMS)                                 65.99
   CO   MASS (GRAMS)                                179.87
   CO2  MASS (GRAMS)                                802.62
   NOX  MASS (GRAMS)                                  1.71
   SO2  MASS (GRAMS)                                  0.00

 HC  GRAMS/KILOMETRE       3.98
 CO  GRAMS/KILOMETRE      10.85
 CO2 GRAMS/KILOMETRE      48.42
 NOX GRAMS/KILOMETRE        .10
 SO2 GRAMS/KILOMETRE       0.00

 HC  GRAMS/KG OF FUEL  61.59      HC  GRAMS/MIN   5.17
 CO  GRAMS/KG OF FUEL  440.4      CO  GRAMS/MIN   14.1
 CO2 GRAMS/KG OF FUEL   1965      CO2 GRAMS/MIN     63
 NOX GRAMS/KG OF FUEL   4.19      NOX GRAMS/MIN    .13
 SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                     29.02  KILOMETRES/LITRE
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                    TABLE                              VEHICLE EMISSION RESULTS
                                         1975  LIGHT DUTY EMISSIONS TEST
                                                                  MFGR. CODE   -0                 YR.  1976
UNIT NO.  300        TEST NO. 1         DATE  6/10/77                                             GVW      0 KG
VEHICLE MODEL  KE-175 2CAT.SER+LEAN     ENGINE   0.00 LITRE 1     CURB WT.      0 KG

                                                            WET BULB TEMP  21.1 DEG. C
BAROMETER 741.93 MM OF HG.                                  ABS. HUMIDITY  13.9 GRAMS/KG
DRY BULB TEMP.   26.1 DEG. C                                DYNO ROLL CONSTANT   967.97
REL. HUMIDITY     64 PCT.

EXHAUST EMISSIONS                                           BLOWER INLET PRESS., G1 127.0 MM. H2O
                                                            BLOWER INLET TEMP.   43 DEG. C
     BLOWER DIF. PRESS., G2, 152.4 MM. H2O
     BAG RESULTS
     BAG NO.                                    1              2              3
     BLOWER REVOLUTIONS                      3185           5456           3178
     ROLL COUNTS                              3409           3801           3435
     HC    SAMPLE  METER READING/SCALE        11.3/4         10.0/3         60.6/3
     HC    SAMPLE   PPM                        1130            100            606
     HC    BACKGRD METER READING/SCALE          .1/4           .1/4          2.2/3
     HC    BACKGRD PPM                            10             10             22
     CO    SAMPLE  METER READING/SCALE        89.7/2         66.6/*         79.3/2
     CO    SAMPLE   PPM                        5617            277           4682
     CO    BACKGRD METER READING/SCALE          .1/2           .1/2           .8/*
     CO    BACKGRD PPM                             4              4              2
     CO2   SAMPLE  METER READING/SCALE        50.4/3         31.5/3         47.2/3
     CO2   SAMPLE   PERCENT                      .87            .52            .81
     CO2   BACKGRD METER READING/SCALE         3.8/3          4.0/3          3.0/3
     CO2   BACKGRD PERCENT                       .06            .06            .05
     NOX   SAMPLE  METER READING/SCALE         3.7/2          1.8/2          3.0/2
     NOX   SAMPLE   PPM                          3.7            1.8            3.0
     NOX   BACKGRD METER READING/SCALE          .4/2           .4/2           .7/2
     NOX   BACKGRD PPM                            .4             .4             .7
     SO2   SAMPLE  METER READING/SCALE        -0.0/*         -0.0/*         -0.0/*
     SO2   SAMPLE   PPM                          0.0            0.0            0.0
     SO2   BACKGRD METER READING/SCALE        -0.0/*         -0.0/*         -0.0/*
     SO2   BACKGRD PPM                           0.0            0.0            0.0

     HC    CONCENTRATION PPM                    1121             90            586
     CO    CONCENTRATION PPM                    5403            265           4509
     CO2   CONCENTRATION PCT                     .82            .46            .77
     NOX   CONCENTRATION PPM                     3.3            1.4            2.4
     SO2   CONCENTRATION PPM                     0.0            0.0            0.0
     HC    MASS GRAMS                          15.25           2.11           7.95
     CO    MASS GRAMS                         149.34          12.45         123.54
     CO2   MASS GRAMS                         356.97         344.42         334.04
     NOX   MASS GRAMS                            .17            .12            .12
     SO2   MASS GRAMS                           0.00           0.00           0.00
     TOTAL CARBON GRAMS                       174.23         101.16         151.02

     WEIGHTED MASS HC       1.10 GRAMS/KILOMETRE
     WEIGHTED MASS CO      12.21 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     57.32 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .02 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE        12.01 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  29.5  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST               426.42 GRAMS
     ESTIMATED FUEL WEIGHT =    .49KG.
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                    TABLE                     VEHICLE EMISSION RESULTS
                                          1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  300        TEST NO. 1          DATE  7/ 5/77
VEHICLE MODEL  KE175 LH+CAT+AIR (0533)   ENGINE    .18 LITRE 1        MFGR. CODE   -0                YR.  1976
                                                                      CURB WT.      0 KG             GVM      0 KG
BAROMETER 744.73 MM OF HG.
DRY BULB TEMP.    26.1 DEG. C                                     WET BULB TEMP  21.7 DEG. C
REL. HUMIDITY      68 PCT.                                        ABS. HUMIDITY  14.7 GRAMS/KG
                                                                  DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

     BLOWER DIF. PRESS., G2, 144.9 MM. H2O                        BLOWER INLET PRESS., G1 127.0 MM. H2O
     BAG RESULTS                                                  BLOWER INLET TEMP.   43 DEG. C
     BAG NO.                                    1              2              3
     BLOWER REVOLUTIONS                       3179           5956           3186
     ROLL COUNTS                              3444           3759           3420
     HC    SAMPLE  METER READING/SCALE       17.5/4         18.8/3         11.1/4
     HC    SAMPLE  PPM                       1750            188           1110
     HC    BACKGRD METER READING/SCALE         .1/4           .1/4          1.7/3
     HC    BACKGRD PPM                         10             10             17
     CO    SAMPLE  METER READING/SCALE       65.3/2         47.1/*         64.3/2
     CO    SAMPLE  PPM                       3505             44           3474
     CO    BACKGRD METER READING/SCALE        .3/3           .1/2          1.5/*
     CO    BACKGRD PPM                          6              4              1
     CO2   SAMPLE  METER READING/SCALE       52.5/3         34.3/3         48.1/3
     CO2   SAMPLE  PERCENT                    .92            .57            .83
     CO2   BACKGRD METER READING/SCALE       4.6/3          4.5/3          4.3/3
     CO2   BACKGRD PERCENT                    .07            .07            .07
     NOX   SAMPLE  METER READING/SCALE       4.7/2          2.9/2          3.9/2
     NOX   SAMPLE  PPM                       4.7            2.9            3.9
     NOX   BACKGRD METER READING/SCALE        .5/2           .7/2           .4/2
     NOX   BACKGRD PPM                        .5             .7             .4
     SO2   SAMPLE  METER READING/SCALE      -0.0/*         -0.0/*         -0.0/*
     SO2   SAMPLE  PPM                       0.0            0.0            0.0
     SO2   BACKGRD METER READING/SCALE      -0.0/*         -0.0/*         -0.0/*
     SO2   BACKGRD PPM                       0.0            0.0            0.0

     HC    CONCENTRATION PPM                 1741            178           1095
     CO    CONCENTRATION PPM                 3361             39           3341
     CO2   CONCENTRATION PCT                  .85            .51            .77
     NOX   CONCENTRATION PPM                  4.3            2.2            3.5
     SO2   CONCENTRATION PPM                  0.0            0.0            0.0
     HC    MASS GRAMS                       23.77           4.18          14.98
     CO    MASS GRAMS                       92.64           1.86          92.29
     CO2   MASS GRAMS                      371.04         378.73         336.30
     NOX   MASS GRAMS                         .22            .20            .18
     SO2   MASS GRAMS                        0.00           0.00           0.00
     TOTAL CARBON GRAMS                    161.56         107.78         144.32

     WEIGHTED MASS HC       1.92 GRAMS/KILOMETRE
     WEIGHTED MASS CO       7.89 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     61.08 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .03 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       11.95 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  29.6  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST               413.67 GRAMS
     ESTIMATED FUEL WEIGHT =   .48KG.
     TABLE       EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                         VEHICLE NUMBER 300

DATE  7/ 5/77                 TIME     -0 HRS.          TEST NO.  1
MODEL  1976 KAKASAKI KE-175 FET LN+CAT+AIR (0533)  ENGINE  .2 LITRE  1
DRIVER   KN                   TEST WT.       0 KG.      GVW    0 KG
WET BULB TEMP  22 C           DRY BULB TEMP  26 C       REL. HUM.  67.7 PCT
SPEC. HUM.  14.7 GRAM/KG      BARO.  744.7 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION          12.76 MINUTES
  BLOWER INLET PRESS.  127.0  MM. H2O
  BLOWER DIF.  PRESS.  152.4  MM  H2O
  BLOWER INLET TEMP.     43  DEG. C
  DYNO REVOLUTIONS      9509
  DISTANCE TRAVELED   15.81  KILOMETRES
  BLOWER REVOLUTIONS     4805
  BLOWER CU. CM /REV.  8295

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              20.4/4
   HC   SAMPLE  PPM                              2040
   HC   BACKGRD METER READING/SCALE                .1/4
   HC   BACKGRD PPM                                10
   CO   SAMPLE  METER READING/SCALE              71.1/1
   CO   SAMPLE  PPM                              7705
   CO   BACKGRD METER READING/SCALE                .1/1
   CO   BACKGRD PPM                                 5
   CO2 SAMPLE   METER READING/SCALE              81.7/3
   CO2 SAMPLE   PERCENT                          1.50
   CO2 BACKGRD METER READING/SCALE                3.8/3
   CO2 BACKGRD PERCENT                             .06
   NOX SAMPLE   METER READING/SCALE               6.7/2
   NOX SAMPLE   PPM                               6.7
   NOX BACKGRD METER READING/SCALE                 .5/2
   NOX BACKGRD PPM                                 .5
   HC   CONCENTRATION PPM                        2032
   CO   CONCENTRATION PPM                        7309
   CO2 CONCENTRATION PCT                         1.46
   NOX CONCENTRATION PPM                          6.3
   SO2 COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                            41.86
   CO   MASS (GRAMS)                           304.01
   CO2 MASS (GRAMS)                            957.27
   NOX MASS (GRAMS)                               .49
   SO2 MASS (GRAMS)                             0.00

 HC   GRAMS/KILOMETRE      2.65
 CO   GRAMS/KILOMETRE     19.23
 CO2 GRAMS/KILOMETRE      60.56
 NOX GRAMS/KILOMETRE        .03
 SO2 GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  84.63     HC   GRAMS/MIN   3.28
 CO   GRAMS/KG OF FUEL  614.7     CO   GRAMS/MIN   23.8
 CO2 GRAMS/KG OF FUEL   1935      CO2 GRAMS/MIN     75
 NOX GRAMS/KG OF FUEL   1.00      NOX GRAMS/MIN    .04
 SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                 23.48  KILOMETRES/LITRE
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                  TABLE                           VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  300           TEST NO. 2          DATE  6/ 6/77                        MFGR. CODE   -0                   YR.  1976
VEHICLE MODEL  KE175 LN+CAT+AIR (0533)      ENGINE     .18 LITRE 1               CURB WT.     0 KG                 GVM     0 KG

BAROMETER 743.20 MM OF HG.                                                   WET BULB TEMP  19.4 DEG. C
DRY BULB TEMP.    26.1 DEG. C                                                ABS. HUMIDITY  11.6 GRAMS/KG
REL. HUMIDITY       54 PCT.                                                  DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                             BLOWER INLET PRESS., G1 124.5 MM. H2O
     BLOWER DIF. PRESS., G2, 149.9 MM. H2O                                   BLOWER INLET TEMP.    43 DEG. C
     BAG RESULTS
     BAG NO.                                      1                2                3
     BLOWER REVOLUTIONS                         3190             5457             3178
     ROLL COUNTS                                 3448             3743             3450
     HC   SAMPLE  METER READING/SCALE           15.9/4           17.8/3           10.4/4
     HC   SAMPLE  PPM                           1590              178             1040
     HC   BACKGRD METER READING/SCALE            .1/4              .1/4             2.4/3
     HC   BACKGRD PPM   .                         10               10               24
     CO   SAMPLE  METER READING/SCALE           62.3/2           47.8/*           57.8/2
     CO   SAMPLE  PPM                           3273               45             2941
     CO   BACKGRD METER READING/SCALE            .1/2              .1/2             2.7/*
     CO   BACKGRD PPM                              4                4                3
     CO2  SAMPLE  METER READING/SCALE           49.8/3           31.9/3           43.4/3
     CO2  SAMPLE  PERCENT                        .86              .53              .74
     CO2  BACKGRD METER READING/SCALE           3.7/3            4.0/3            4.4/3
     CO2  BACKGRD PERCENT                        .06              .06              .07
     NOX  SAMPLE  METER READING/SCALE           5.8/2            2.3/2            3.2/2
     NOX  SAMPLE  PPM                           5.8              2.3              3.2
     NOX  BACKGRD METER READING/SCALE            .3/2             .4/2             .5/2
     NOX  BACKGRD PPM                             .3               .4               .5
     SO2  SAMPLE  METER READING/SCALE          -0.0/*           -0.0/*           -0.0/*
     SO2  SAMPLE  PPM                           0.0              0.0              0.0
     SO2  BACKGRD METER READING/SCALE          -0.0/*           -0.0/*           -0.0/*
     SO2  BACKGRD PPM                           0.0              0.0              0.0

     HC   CONCENTRATION PPM                     1581              168             1018
     CO   CONCENTRATION PPM                     3159               40             2846
     CO2  CONCENTRATION PCT                      .81              .47              .68
     NOX  CONCENTRATION PPM                      5.5              1.9              2.7
     SO2  CONCENTRATION PPM                      0.0              0.0              0.0
     HC   MASS GRAMS                           21.62             3.94            13.87
     CO   MASS GRAMS                           87.20             1.90            78.26
     CO2  MASS GRAMS                          354.10           351.11           295.09
     NOX  MASS GRAMS                             .26              .15              .13
     SO2  MASS GRAMS                            0.00             0.00             0.00
     TOTAL CARBON GRAMS                       152.75           100.05           126.10

     WEIGHTED MASS HC       1.77 GRAMS/KILOMETRE
     WEIGHTED MASS CO       7.03 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     56.17 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .03 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       11.96 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  32.3  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST              378.89 GRAMS
     ESTIMATED FUEL WEIGHT =    .44KG.
     TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 300

DATE  6/ 6/77                  TIME    -0 HRS.          TEST NO.  2
MODEL  1976 KAWASAKI KE-175 FET LN+CAT+AIR (0533)  ENGINE 0.0 LITRE  1
DRIVER   KN                    TEST WT.      0 KG.      GVW     0 KG
WET BULB TEMP  19 C            DRY BULB TEMP  26 C      REL. HUM.  53.6 PCT
SPEC. HUM.  11.6 GRAM/KG   BARO.  743.2 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION          12.76 MINUTES
  BLOWER INLET PRESS.  127.0  MM. H20
  BLOWER DIF.  PRESS.  152.4  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9607
  DISTANCE TRAVELED   15.97  KILOMETRES
  BLOWER REVOLUTIONS     4804
  BLOWER CU. CM /REV.  8293

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                21.8/4
   HC   SAMPLE  PPM                                2180
   HC   BACKGRD METER READING/SCALE                  .2/4
   HC   BACKGRD PPM                                  20
   CO   SAMPLE  METER READING/SCALE                73.3/1
   CO   SAMPLE  PPM                                8155
   CO   BACKGRD METER READING/SCALE                  .1/1
   CO   BACKGRD PPM                                   5
   CO2  SAMPLE  METER READING/SCALE                78.3/3
   CO2  SAMPLE  PERCENT                            1.43
   CO2  BACKGRD METER READING/SCALE                 3.1/3
   CO2  BACKGRD PERCENT                             .05
   NOX  SAMPLE  METER READING/SCALE                 4.2/2
   NOX  SAMPLE  PPM                                 4.2
   NOX  BACKGRD METER READING/SCALE                  .4/2
   NOX  BACKGRD PPM                                  .4
   HC   CONCENTRATION PPM                          2164
   CO   CONCENTRATION PPM                          7785
   CO2  CONCENTRATION PCT                          1.40
   NOX  CONCENTRATION PPM                           3.9
   SO2  COCENTRATION PPM                           0.0
   HC   MASS (GRAMS)                              44.46
   CO   MASS (GRAMS)                             323.00
   CO2  MASS (GRAMS)                             914.55
   NOX  MASS (GRAMS)                                .27
   SO2  MASS (GRAMS)                               0.00

HC   GRAMS/KILOMETRE      2.78
CO   GRAMS/KILOMETRE     20.23
CO2  GRAMS/KILOMETRE     57.27
NOX  GRAMS/KILOMETRE       .02
SO2  GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL  90.16     HC   GRAMS/MIN   3.49
CO   GRAMS/KG OF FUEL  655.0     CO   GRAMS/MIN   25.3
CO2  GRAMS/KG OF FUEL   1955     CO2  GRAMS/MIN     72
NOX  GRAMS/KG OF FUEL    .55     NOX  GRAMS/MIN    .02
SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                 23.79  KILOMETRES/LITRE
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                     TABLE                    VEHICLE EMISSION RESULTS
                                         1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  300        TEST NO. 3       DATE  7/14/77                  MFGR. CODE   -0                YR.  1976
VEHICLE MODEL  KE175 LN+CAT+AIR (1033)  ENGINE    .18 LITRE 1         CURB WT.     0 KG              GVW      0 KG

BAROMETER 742.95 MM OF HG.                                         WET BULB TEMP  20.6 DEG. C
DRY BULB TEMP.   26.1 DEG. C                                       ABS. HUMIDITY  13.1 GRAMS/KG
REL. HUMIDITY     61 PCT.                                          DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS

     BLOWER DIF. PRESS., G2, 152.4 MM. H2O                         BLOWER INLET PRESS., G1 124.5 MM. H2O
     BAG RESULTS                                                   BLOWER INLET TEMP.   43 DEG. C
     BAG NO.                                    1             2              3
     BLOWER REVOLUTIONS                        3184          5453           3173
     ROLL COUNTS                                3456          3776           3447
     HC   SAMPLE  METER READING/SCALE          14.1/4        16.8/3         10.9/4
     HC   SAMPLE  PPM                          1410           168           1090
     HC   BACKGRD METER READING/SCALE           .1/4          .2/4          2.1/3
     HC   BACKGRD PPM                           10            20             21
     CO   SAMPLE  METER READING/SCALE          44.4/3        32.7/*         59.7/2
     CO   SAMPLE  PPM                          2783           30            3079
     CO   BACKGRD METER READING/SCALE           .3/3          .1/3          8.9/*
     CO   BACKGRD PPM                            6             2              9
     CO2  SAMPLE  METER READING/SCALE          44.2/3        28.3/3         42.8/3
     CO2  SAMPLE  PERCENT                       .76           .47            .73
     CO2  BACKGRD METER READING/SCALE           4.1/3         3.1/3          3.6/3
     CO2  BACKGRD PERCENT                       .06           .05            .06
     NOX  SAMPLE  METER READING/SCALE           7.1/2         2.1/2          6.0/2
     NOX  SAMPLE  PPM                           7.1           2.1            6.0
     NOX  BACKGRD METER READING/SCALE           .4/2          .2/2           .2/2
     NOX  BACKGRD PPM                           .4            .2             .2
     SO2  SAMPLE  METER READING/SCALE         -0.0/*        -0.0/*         -0.0/*
     SO2  SAMPLE  PPM                          0.0           0.0            0.0
     SO2  BACKGRD METER READING/SCALE         -0.0/*        -0.0/*         -0.0/*
     SO2  BACKGRD PPM                          0.0           0.0            0.0

     HC   CONCENTRATION PPM                    1401           144           1071
     CO   CONCENTRATION PPM                    2682            27           2968
     CO2  CONCENTRATION PCT                     .70           .42            .68
     NOX  CONCENTRATION PPM                     6.7           1.9            5.8
     SO2  CONCENTRATION PPM                     0.0           0.0            0.0
     HC   MASS GRAMS                           19.08          3.47          14.53
     CO   MASS GRAMS                           73.75          1.27          81.33
     CO2  MASS GRAMS                          303.53        312.18         294.08
     NOX  MASS GRAMS                            .33           .16            .28
     SO2  MASS GRAMS                           0.00          0.00           0.00
     TOTAL CARBON GRAMS                       130.98         88.75         127.71

     WEIGHTED MASS HC        1.66 GRAMS/KILOMETRE
     WEIGHTED MASS CO        6.60 GRAMS/KILOMETRE
     WEIGHTED MASS CO2      50.81 GRAMS/KILOMETRE
     WEIGHTED MASS NOX        .04 GRAMS/KILOMETRE
     WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE        12.01 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  35.4  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST              347.44 GRAMS
     ESTIMATED FUEL WEIGHT =   .40KG.
     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMAER 300

DATE  7/19/77                  TIME    -0 HRS.             TEST NO.  3
MODEL  1976 KAWASAKI KE-175 FET LN+CAT+AIR  (1033)  ENGINE  .2 LITRE  1
DRIVER   KN                    TEST WT.      0 KG.         GVW    0 KG
WET BULB TEMP  18 C            DRY BULB TEMP  23 C         REL. HUM.  58.1 PCT
SPEC. HUM.  10.6 GRAM/KG       BARO.  741.4 MM  HG.        MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.    127.0  MM. H2O
  BLOWER DIF.  PRESS.    152.4  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS       9592
  DISTANCE TRAVELED     15.94  KILOMETRES
  BLOWER REVOLUTIONS      4806
  BLOWER CU. CM /REV.   8292

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE          14.2/4
   HC   SAMPLE  PPM                          1420
   HC   BACKGRD METER READING/SCALE            .2/4
   HC   BACKGRD PPM                            20
   CO   SAMPLE  METER READING/SCALE          83.5/2
   CO   SAMPLE  PPM                          5057
   CO   BACKGRD METER READING/SCALE            .3/2
   CO   BACKGRD PPM                            11
   CO2  SAMPLE  METER READING/SCALE          74.7/3
   CO2  SAMPLE  PERCENT                      1.3[illegible]
   CO2  BACKGRD METER READING/SCALE           4.[illegible]/3
   CO2  BACKGRD PERCENT                       .06
   NOX  SAMPLE  METER READING/SCALE          14.8/2
   NOX  SAMPLE  PPM                          14.8
   NOX  BACKGRD METER READING/SCALE            .6/2
   NOX  BACKGRD PPM                            .6
   HC   CONCENTRATION PPM                    1403
   CO   CONCENTRATION PPM                    4820
   CO2  CONCENTRATION PCT                    1.31
   NOX  CONCENTRATION PPM                    14.3
   SO2  COCENTRATION PPM                     0.0
   HC   MASS (GRAMS)                        28.77
   CO   MASS (GRAMS)                       199.56
   CO2  MASS (GRAMS)                       855.24
   NOX  MASS (GRAMS)                          .97
   SO2  MASS (GRAMS)                         0.00

 HC   GRAMS/KILOMETRE       1.80
 CO   GRAMS/KILOMETRE      12.52
 CO2  GRAMS/KILOMETRE      53.64
 NOX  GRAMS/KILOMETRE        .06
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  72.37     HC   GRAMS/MIN    2.25
 CO   GRAMS/KG OF FUEL  502.0     CO   GRAMS/MIN    15.6
 CO2  GRAMS/KG OF FUEL   2151     CO2  GRAMS/MIN     67
 NOX  GRAMS/KG OF FUEL   2.44     NOX  GRAMS/MIN     .08
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY                 29.46  KILOMETRES/LITRE
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                    TABLE                           VEHICLE EMISSION RESULTS
                                               1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  300        TEST NO. 4           DATE  7/26/77
VEHICLE MODEL  KE175 LN+CAT+AIR (1033)    ENGINE    .18 LITRE 1        MFGR. CODE   -0                  YR.  1976
                                                                        CURB WT.     0 KG                GVM     0 KG
BAROMETER 742.19 MM OF HG.
DRY BULB TEMP.    28.3 DEG. C                                       WET BULB TEMP  20.0 DEG. C
REL. HUMIDITY      46 PCT.                                          ABS. HUMIDITY  11.4 GRAMS/KG
                                                                    DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 152.4 MM. H2O                           BLOWER INLET PRESS., G1 127.0 MM. H2O
    BAG RESULTS                                                     BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                      1             2             3
    BLOWER REVOLUTIONS                        3178          5450          3181
    ROLL COUNTS                               3426          3761          3402
    HC   SAMPLE  METER READING/SCALE        16.5/4        18.3/3        11.6/4
    HC   SAMPLE  PPM                          1650           183          1160
    HC   BACKGRD METER READING/SCALE          .2/4          .4/4         2.0/3
    HC   BACKGRD PPM                            20            40            20
    CO   SAMPLE  METER READING/SCALE        64.2/2        34.8/*        58.2/2
    CO   SAMPLE  PPM                          3419            32          2970
    CO   BACKGRD METER READING/SCALE          .1/2          .1/2         1.9/*
    CO   BACKGRD PPM                             4             4             2
    CO2  SAMPLE  METER READING/SCALE        51.7/3        33.0/3        46.7/3
    CO2  SAMPLE  PERCENT                       .90           .55           .80
    CO2  BACKGRD METER READING/SCALE         2.6/3         3.5/3         4.2/3
    CO2  BACKGRD PERCENT                       .04           .05           .06
    NOX  SAMPLE  METER READING/SCALE         9.0/2         3.0/2         8.3/2
    NOX  SAMPLE  PPM                           9.0           3.0           8.3
    NOX  BACKGRD METER READING/SCALE          .4/2          .4/2          .6/2
    NOX  BACKGRD PPM                            .4            .4            .6
    SO2  SAMPLE  METER READING/SCALE        -0.0/*        -0.0/*        -0.0/*
    SO2  SAMPLE  PPM                           0.0           0.0           0.0
    SO2  BACKGRD METER READING/SCALE        -0.0/*        -0.0/*        -0.0/*
    SO2  BACKGRD PPM                           0.0           0.0           0.0

    HC   CONCENTRATION PPM                    1632           145          1142
    CO   CONCENTRATION PPM                    3306            27          2878
    CO2  CONCENTRATION PCT                     .86           .50           .75
    NOX  CONCENTRATION PPM                     8.6           2.6           7.8
    SO2  CONCENTRATION PPM                     0.0           0.0           0.0
    HC   MASS GRAMS                          22.15          3.37         15.52
    CO   MASS GRAMS                          90.59          1.29         78.96
    CO2  MASS GRAMS                         374.14        369.75        322.90
    NOX  MASS GRAMS                            .40           .21           .36
    SO2  MASS GRAMS                           0.00          0.00          0.00
    TOTAL CARBON GRAMS                      160.13        109.38        135.42

    WEIGHTED MASS HC       1.82 GRAMS/KILOMETRE
    WEIGHTED MASS CO       7.15 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     59.94 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .05 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.93 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  30.6  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              399.93 GRAMS
    ESTIMATED FUEL WEIGHT =    .46KG.
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      TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 300
DATE  7/26/77                  TIME     -0 HRS.           TEST NO.  4
MODEL  1976 KAWASAKI KE-175 FET LN+CAT+AIR  (1033) ENGINE  .2 LITRE  1
DRIVER   KN                    TEST WT.      0 KG.        GVW    0 KG
WET BULB TEMP  19 C            DRY BULB TEMP  28 C        REL. HUM.  43.2 PCT
SPEC. HUM.  10.6 GRAM/KG       BARO.  742.7 MM  HG.       MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.   127.0  MM. H20
  BLOWER DIF.  PRESS.   152.4  MM  H20
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS       9476
  DISTANCE TRAVELED     15.75  KILOMETRES
  BLOWER REVOLUTIONS      4807
  BLOWER CU. CM /REV.   8293

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                17.2/4
   HC   SAMPLE  PPM                                1720
   HC   BACKGRD METER READING/SCALE                 1.9/3
   HC   BACKGRD PPM                                 19
   CO   SAMPLE  METER READING/SCALE                66.7/1
   CO   SAMPLE  PPM                                6875
   CO   BACKGRD METER READING/SCALE                  .1/1
   CO   BACKGRD PPM                                   5
   CO2  SAMPLE  METER READING/SCALE                87.0/3
   CO2  SAMPLE  PERCENT                            1.62
   CO2  BACKGRD METER READING/SCALE                 4.2/3
   CO2  BACKGRD PERCENT                             .06
   NOX  SAMPLE  METER READING/SCALE                20.3/2
   NOX  SAMPLE  PPM                                20.3
   NOX  BACKGRD METER READING/SCALE                  .8/2
   NOX  BACKGRD PPM                                  .8
   HC   CONCENTRATION PPM                          1704
   CO   CONCENTRATION PPM                          6561
   CO2  CONCENTRATION PCT                          1.56
   NOX  CONCENTRATION PPM                          19.6
   SO2  COCENTRATION PPM                           0.0
   HC   MASS (GRAMS)                              35.02
   CO   MASS (GRAMS)                             272.21
   CO2  MASS (GRAMS)                            1023.87
   NOX  MASS (GRAMS)                               1.33
   SO2  MASS (GRAMS)                               0.00

HC   GRAMS/KILOMETRE      2.22
CO   GRAMS/KILOMETRE     17.28
CO2  GRAMS/KILOMETRE     65.00
NOX  GRAMS/KILOMETRE       .08
SO2  GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL   71.04     HC   GRAMS/MIN    2.74
CO   GRAMS/KG OF FUEL   552.1     CO   GRAMS/MIN    21.3
CO2  GRAMS/KG OF FUEL    2077     CO2  GRAMS/MIN      80
NOX  GRAMS/KG OF FUEL    2.71     NOX  GRAMS/MIN     .10
SO2  GRAMS/KG OF FUEL    0.00     SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY
                                           23.47  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki TS-100

Date 4/29/77 Sequence TSS-1 Baseline

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	----	----	4.26	5.07	9.8	12.	93,600
20	2	----	0.47	3.91	10.99	2.8	20.	24,200
30	4	----	1.03	2.26	11.49	2.4	70.	26,600
40	5	----	1.79	5.04	8.90	4.3	100.	39,800
50	5	----	2.80	5.96	8.26	4.3	160.	43,400
Idle	N	----	----	4.87	5.10	9.0	16.	96,500

Notes: Run after pilot air screw out 2 turns, as received
Idle brought down to lowest runable idle speed
Max. head temp. of 250°C reached at 50 mph
WOT accel. time 0 - 80 kph = 20.6 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki TS-100

Date 5/19/77 Sequence TSS-2

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	----	----	3.81	5.61	10.3	9.	86,400
20	2	----	0.43	3.12	11.44	3.2	23.	23,200
30	4	----	0.98	2.79	10.88	4.0	56.	27,200
40	5	----	1.79	6.38	8.01	4.7	60.	40,400
50	5	----	2.87	6.22	7.92	5.3	115.	44,400
Idle	N	----	----	4.56	5.45	9.8	12.	88,000

Notes: Run with carburetor settings as TSS-1 but with modified rotary valve
Valve intake angle area reduced by 20° total - 10° from either side
No significant improvement noted
Max. head temp. of 250°C reached at 50 mph
WOT accel time 0 - 80 kph = 24.5 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki TS-100

Date 6/2/77 Sequence TSS-3

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
Idle	N	----	----	2.83	5.72	10.1	9.	71,600
20	2	----	0.48	2.79	11.33	2.6	24.	20,000
30	4	----	0.98	2.23	11.22	3.5	67.	24,700
40	5	----	1.76	5.16	8.59	3.9	88.	36,800
50	5	----	2.80	6.22	7.88	3.8	120.	41,500
Idle	N	----	----	4.36	5.73	8.4	14.	81,600

Notes: Run with stock I.O. of rotary valve + 10° advance of I.C.
No significant improvement noted
Max. head temp. at 50 mph = 240°C
WOT accel. time 0 - 80 kph = 23.8 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki TS-100

Date 6/11/77 Sequence TSS-4

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	----	----	2.87	6.17	9.3	8.	66,400	
20	2	----	0.47	0.08	12.10	4.1	53.	15,700	
30	4	----	1.03	0.09	9.91	7.0	90.	22,800	
40	5	----	1.78	0.12	10.95	5.7	840.	27,000	
50	5	----	2.99	0.91	10.99	4.2	1325.	26,400	> missed as though engine was about to lock-up as temperature reached 250°
Idle	N	----	----	3.02	6.50	8.6	9.	63,400	

Notes: Stock rotary valve; lean carburetor + CDI by Syncro
Carburetor: clip moved from 3 to 1 ; pilot air opened from 2 to 2-1/4
Max. head temp. 250°C at 50 mph Max. exhaust gas temp. 700°C at 50 mph
W.O.T. accel time 0 - 80 kph = 19.9 sec

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki TS-100

Date 8/3/77 Sequence TSS-5

Condition				Concentrations					Exhaust Temperature, °C		
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Enter Cat.	Exit Cat.	Head Temp, °C
Idle	N	--	--	2.92	13.00	1.1	0.8	18,500	300	375	100
20	2	--	0.49	0.91	14.79	0.0	6.1	11,400	275	425	230
30	4	--	1.04	0.06	14.53	1.1	335.	120	350	510	250
40	5	--	Head temperature exceeds 250°C								
50	5	--	Max. speed at W.O.T. 41 mph								
Idle	N	--	--	3.60	12.80	0.9	2.1	21,000	300	400	160

Notes: Lean carburetor + CDI + Catalyst - compressed air injection (data presented here at 0 air) PTX 314 (3" substrate, 1" Torvex)

Performance degradation too severe for further testing of this configuration

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki TS-100

Date 8/25/77 Sequence TSS-6 (modified catalyst)

Conditon				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Air Injection Rate, cfm
Idle	N	1400	----	0.08	12.60	4.3	10.	1700	0.43
20	2	----	0.40	0.04	9.75	7.8	13.	1490	1.76
30	4	----	0.93	0.01	9.52	6.9	120.	3280	1.64
40	5	----	1.73	0.28	12.26	3.0	470.	3800	1.65
.O.T. 49	5	----	2.73	5.49	11.10	1.0	100.	9760	1.89
Idle	N	1400	----	0.05	12.70	3.9	13.	1120	0.43

Notes: Lean carb + CDI + Catalyst(Modified 1" Torvex 1-1/2" substrate) + Air (Pump No. 10

W.O.T. acceleration time 0-70 kph = 22 sec. (Could not exceed 49 mph)

Max. exhaust gas temp exit head = 655°C at 40 mph

Max. head temp. = 255°C at 49 mph

Max. catalyst exit temp = 875 °C at 49 mph

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                    TABLE                    VEHICLE EMISSION RESULTS
                                         1975 LIGHT DUTY EMISSIONS TEST
UNIT NO. 100       TEST NO. 1       DATE 10/18/76                MFGR. CODE   -0                     YR.  1976
VEHICLE MODEL  SUZUKI TS100         ENGINE    .10 LITRE 1           CURB WT.     0 KG                 GVM     0 KG

BAROMETER 742.44 MM OF HG.
DRY BULB TEMP.   27.2 DEG. C                                   WET BULB TEMP  18.3 DEG. C
REL. HUMIDITY     42 PCT.                                      ABS. HUMIDITY   9.6 GRAMS/KG
                                                               DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

   BLOWER DIF. PRESS., G2, 132.1 MM. H2O                       BLOWER INLET PRESS., G1 127.0 MM. H2O
   BAG RESULTS                                                 BLOWER INLET TEMP.   43 DEG. C
   BAG NO.                                  1              2              3
   BLOWER REVOLUTIONS                    3187           5431           3183
   ROLL COUNTS                            2739           3653           2756
   HC   SAMPLE  METER READING/SCALE      25.4/4         18.3/4         24.5/4
   HC   SAMPLE  PPM                      2540           1830           2450
   HC   BACKGRD METER READING/SCALE       3.3/3          3.7/3          3.3/3
   HC   BACKGRD PPM                        33             37             33
   CO   SAMPLE  METER READING/SCALE      78.4/3         67.5/3         95.1/3
   CO   SAMPLE  PPM                      2108           1741           2818
   CO   BACKGRD METER READING/SCALE        .2/3           .8/3           .1/3
   CO   BACKGRD PPM                         4             17              2
   CO2  SAMPLE  METER READING/SCALE      28.6/3         21.8/3         24.6/3
   CO2  SAMPLE  PERCENT                    .47            .35            .40
   CO2  BACKGRD METER READING/SCALE       3.4/3          2.8/3          3.1/3
   CO2  BACKGRD PERCENT                    .05            .04            .05
   NOX  SAMPLE  METER READING/SCALE       4.0/2          3.0/2          3.9/2
   NOX  SAMPLE  PPM                       4.0            3.0            3.9
   NOX  BACKGRD METER READING/SCALE        .9/2           .7/2           .8/2
   NOX  BACKGRD PPM                        .9             .7             .8
   SO2  SAMPLE  METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
   SO2  SAMPLE  PPM                      0.0            0.0            0.0
   SO2  BACKGRD METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
   SO2  BACKGRD PPM                      0.0            0.0            0.0

   HC   CONCENTRATION PPM                2509           1795           2419
   CO   CONCENTRATION PPM                2056           1690           2756
   CO2  CONCENTRATION PCT                 .42            .31            .36
   NOX  CONCENTRATION PPM                 3.2            2.3            3.2
   SO2  CONCENTRATION PPM                 0.0            0.0            0.0
   HC   MASS GRAMS                      34.63          42.21          33.34
   CO   MASS GRAMS                      57.29          80.23          76.69
   CO2  MASS GRAMS                     185.83         233.79         156.65
   NOX  MASS GRAMS                        .14            .18            .14
   SO2  MASS GRAMS                       0.00           0.00           0.00
   TOTAL CARBON GRAMS                  105.26         134.75         104.50

   WEIGHTED MASS HC      7.15 GRAMS/KILOMETRE
   WEIGHTED MASS CO     13.96 GRAMS/KILOMETRE
   WEIGHTED MASS CO2    37.87 GRAMS/KILOMETRE
   WEIGHTED MASS NOX      .03 GRAMS/KILOMETRE
   WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE      10.64 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  28.6  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST          344.51 GRAMS
   ESTIMATED FUEL WEIGHT =   .90KG.
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      TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 100

 DATE 10/18/76               TIME    -0 HRS.          TEST NO.  1
 MODEL  1976 SUZUKI TS100    HIWAY CYCLE              ENGINE  .1 LITRE  1
 DRIVER   TJ                 TEST WT.     0 KG.       GVW    0 KG
 WET BULB TEMP  18 C         DRY BULB TEMP  27 C      REL. HUM.  44.4 PCT
 SPEC. HUM.   9.9 GRAM/KG    BARO.  742.4 MM  HG.     MEASURED FUEL  0.00 KG

   RUN DURATION           12.79 MINUTES
   BLOWER INLET PRESS.  127.0  MM. H2O
   BLOWER DIF.  PRESS.  132.1  MM  H2O
   BLOWER INLET TEMP.      43  DEG. C
   DYNO REVOLUTIONS       9452
   DISTANCE TRAVELED    15.71  KILOMETRES
   BLOWER REVOLUTIONS      4817
   BLOWER CU. CM /REV.  8403

   BAG RESULTS
    HC   SAMPLE  METER READING/SCALE                 51.8/4
    HC   SAMPLE  PPM                                 5180
    HC   BACKGRD METER READING/SCALE                  3.4/3
    HC   BACKGRD PPM                                   34
    CO   SAMPLE  METER READING/SCALE                 78.9/1
    CO   SAMPLE  PPM                                 9430
    CO   BACKGRD METER READING/SCALE                   .1/1
    CO   BACKGRD PPM                                    5
    CO2  SAMPLE  METER READING/SCALE                 53.4/3
    CO2  SAMPLE  PERCENT                               .93
    CO2  BACKGRD METER READING/SCALE                  3.7/3
    CO2  BACKGRD PERCENT                               .06
    NOX  SAMPLE  METER READING/SCALE                 11.1/2
    NOX  SAMPLE  PPM                                 11.1
    NOX  BACKGRD METER READING/SCALE                  1.1/2
    NOX  BACKGRD PPM                                  1.1
    HC   CONCENTRATION PPM                           5152
    CO   CONCENTRATION PPM                           9121
    CO2  CONCENTRATION PCT                            .89
    NOX  CONCENTRATION PPM                           10.2
    SO2  COCENTRATION PPM                             0.0
    HC   MASS (GRAMS)                              107.46
    CO   MASS (GRAMS)                              384.12
    CO2  MASS (GRAMS)                              589.48
    NOX  MASS (GRAMS)                                 .69
    SO2  MASS (GRAMS)                                0.00

 HC   GRAMS/KILOMETRE        6.84
 CO   GRAMS/KILOMETRE       24.45
 CO2  GRAMS/KILOMETRE       37.52
 NOX  GRAMS/KILOMETRE         .04
 SO2  GRAMS/KILOMETRE        0.00

 HC   GRAMS/KG OF FUEL  *2.08     HC   GRAMS/MIN    8.40
 CO   GRAMS/KG OF FUEL  793.8     CO   GRAMS/MIN   30.0
 CO2  GRAMS/KG OF FUEL   1218     CO2  GRAMS/MIN     46
 NOX  GRAMS/KG OF FUEL   1.42     NOX  GRAMS/MIN     .05
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                      23.85  KILOMETRES/LITRE
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                         TABLE                              VEHICLE EMISSION RESULTS
                                               1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  100          TEST NO. 2           DATE 10/19/76
VEHICLE MODEL  SUZUKI TS100                 ENGINE      .10 LITRE 1               MFGR. CODE    -0                      YR.  1976
                                                                                  CURB WT.      0 KG                    GVM      0 KG
BAROMETER 744.98 MM OF HG.
DRY BULB TEMP.    25.6 DEG. C                                               WET BULB TEMP  16.7 DEG. C
REL. HUMIDITY      40 PCT.                                                  ABS. HUMIDITY    8.3 GRAMS/KG
                                                                            DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 132.1 MM, H2O                                   BLOWER INLET PRESS., G1 127.0 MM, H2O
    BAG RESULTS                                                             BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                      1               2               3
    BLOWER REVOLUTIONS                        3189            5449            3187
    ROLL COUNTS                               2777            3716            2787
    HC   SAMPLE  METER READING/SCALE         27.3/4          17.9/4          23.3/4
    HC   SAMPLE  PPM                          2730            1790            2330
    HC   BACKGRD METER READING/SCALE          2.5/3           3.5/3           3.0/3
    HC   BACKGRD PPM                           25              35              30
    CO   SAMPLE  METER READING/SCALE         72.8/3          61.8/3          87.1/3
    CO   SAMPLE  PPM                          1913            1567            2448
    CO   BACKGRD METER READING/SCALE           .2/3            .1/3            .2/3
    CO   BACKGRD PPM                             4               2               4
    CO2  SAMPLE  METER READING/SCALE         26.8/3          20.2/3          24.5/3
    CO2  SAMPLE  PERCENT                       .44             .33             .40
    CO2  BACKGRD METER READING/SCALE          1.1/3           1.4/3           1.2/3
    CO2  BACKGRD PERCENT                       .02             .02             .02
    NOX  SAMPLE  METER READING/SCALE          4.5/2           3.3/2           4.0/2
    NOX  SAMPLE  PPM                           4.5             3.3             4.0
    NOX  BACKGRD METER READING/SCALE           .8/2            .7/2            .7/2
    NOX  BACKGRD PPM                            .8              .7              .7
    SO2  SAMPLE  METER READING/SCALE         -0.0/*          -0.0/*          -0.0/*
    SO2  SAMPLE  PPM                           0.0             0.0             0.0
    SO2  BACKGRD METER READING/SCALE         -0.0/*          -0.0/*          -0.0/*
    SO2  BACKGRD PPM                           0.0             0.0             0.0

    HC   CONCENTRATION PPM                    2707            1757            2302
    CO   CONCENTRATION PPM                    1868            1535            2394
    CO2  CONCENTRATION PCT                     .42             .30             .38
    NOX  CONCENTRATION PPM                     3.8             2.6             3.3
    SO2  CONCENTRATION PPM                     0.0             0.0             0.0
    HC   MASS GRAMS                          37.52           41.60           31.89
    CO   MASS GRAMS                          52.28           73.39           66.95
    CO2  MASS GRAMS                         187.15          230.13          168.65
    NOX  MASS GRAMS                            .16             .19             .14
    SO2  MASS GRAMS                           0.00            0.00            0.00
    TOTAL CARBON GRAMS                      105.97          130.29          102.34

    WEIGHTED MASS HC       7.03 GRAMS/KILOMETRE
    WEIGHTED MASS CO      12.41 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     37.65 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .03 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        10.80 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  29.7  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST             338.60 GRAMS
    ESTIMATED FUEL WEIGHT =   .39KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 100

DATE 10/19/76               TIME    -0 HRS.        TEST NO.  2
MODEL  1976 SUZUKI TS100    HIWAY CYCLE            ENGINE  .1 LITRE  1
DRIVER   TJ                 TEST WT.      0 KG.    GVW    0 KG
WET BULB TEMP  16 C         DRY BULB TEMP  24 C    REL. HUM.  40.4 PCT
SPEC. HUM.    7.7 GRAM/KG   BARO.  745.0 MM  HG.   MEASURED FUEL  0.00 KG

  RUN DURATION           12.77 MINUTES
  BLOWER INLET PRESS.   457.2  MM. H2O
  BLOWER DIF.  PRESS.   477.5  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      4712
  DISTANCE TRAVELED    16.14  KILOMETRES
  BLOWER REVOLUTIONS      4480
  BLOWER CU. CM /REV.  8108

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                  34.1/4
   HC  SAMPLE  PPM                                  3410
   HC  BACKGRD METER READING/SCALE                   3.6/3
   HC  BACKGRD PPM                                    36
   CO  SAMPLE  METER READING/SCALE                  84.1/2
   CO  SAMPLE  PPM                                  5111
   CO  BACKGRD METER READING/SCALE                    .2/2
   CO  BACKGRD PPM                                      8
   CO2 SAMPLE  METER READING/SCALE                  31.6/3
   CO2 SAMPLE  PERCENT                                .52
   CO2 BACKGRD METER READING/SCALE                   3.5/3
   CO2 BACKGRD PERCENT                                .05
   NOX SAMPLE  METER READING/SCALE                   6.8/2
   NOX SAMPLE  PPM                                   6.8
   NOX BACKGRD METER READING/SCALE                    .7/2
   NOX BACKGRD PPM                                     .7
   HC  CONCENTRATION PPM                            3378
   CO  CONCENTRATION PPM                            4985
   CO2 CONCENTRATION PCT                             .48
   NOX CONCENTRATION PPM                             6.2
   SO2 COCENTRATION PPM                             0.0
   HC  MASS (GRAMS)                               129.81
   CO  MASS (GRAMS)                               386.82
   CO2 MASS (GRAMS)                               583.41
   NOX MASS (GRAMS)                                  .71
   SO2 MASS (GRAMS)                                 0.00

HC  GRAMS/KILOMETRE      8.04
CO  GRAMS/KILOMETRE     23.96
CO2 GRAMS/KILOMETRE     36.14
NOX GRAMS/KILOMETRE       .04
SO2 GRAMS/KILOMETRE      0.00

HC  GRAMS/KG OF FUEL  46.71     HC  GRAMS/MIN  10.17
CO  GRAMS/KG OF FUEL  765.0     CO  GRAMS/MIN   30.3
CO2 GRAMS/KG OF FUEL   1154     CO2 GRAMS/MIN     46
NOX GRAMS/KG OF FUEL   1.41     NOX GRAMS/MIN    .06
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                    23.45  KILOMETRES/LITRE
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                     TABLE                  VEHICLE EMISSION RESULTS
                                       1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  100        TEST NO.        DATE  5/ 2/77                   MFGR. CODE    -0                  YR.  1976
VEHICLE MODEL  TS-100 BASE RTN       ENGINE   .10 LITRE 1            CURB WT.       0 KG               GVM      0 KG

BAROMETER 740.41 MM OF HG.
DRY BULB TEMP.    27.2 DEG. C                                      WET BULB TEMP  20.6 DEG. C
REL. HUMIDITY      55 PCT.                                         ABS. HUMIDITY  12.7 GRAMS/KG
                                                                   DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 152.4 MM. H2O                          BLOWER INLET PRESS., G1 127.0 MM. H2O
    BAG RESULTS                                                    BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                      1              2              3
    BLOWER REVOLUTIONS                         3182           5450           3183
    ROLL COUNTS                                2857           3784           2860
    HC   SAMPLE  METER READING/SCALE          17.1/4         11.3/4         14.5/4
    HC   SAMPLE  PPM                           1710           1130           1450
    HC   BACKGRD METER READING/SCALE            .1/4           .2/4           .3/4
    HC   BACKGRD PPM                             10             20             30
    CO   SAMPLE  METER READING/SCALE          54.4/3         42.2/3         69.2/3
    CO   SAMPLE  PPM                           1353           1021           1795
    CO   BACKGRD METER READING/SCALE            .1/3           .1/3           .3/3
    CO   BACKGRD PPM                              2              2              6
    CO2  SAMPLE  METER READING/SCALE          28.6/3         22.1/3         24.7/3
    CO2  SAMPLE  PERCENT                        .47            .36            .40
    CO2  BACKGRD METER READING/SCALE           3.9/3          4.1/3          3.9/3
    CO2  BACKGRD PERCENT                        .06            .06            .06
    NOX  SAMPLE  METER READING/SCALE           3.7/2          2.1/2          3.1/2
    NOX  SAMPLE  PPM                            3.7            2.1            3.1
    NOX  BACKGRD METER READING/SCALE            .5/2           .5/2           .6/2
    NOX  BACKGRD PPM                             .5             .5             .6
    SO2  SAMPLE  METER READING/SCALE         -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                            0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE         -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                            0.0            0.0            0.0

    HC   CONCENTRATION PPM                     1701           1111           1422
    CO   CONCENTRATION PPM                     1315            944           1743
    CO2  CONCENTRATION PCT                      .41            .30            .35
    NOX  CONCENTRATION PPM                      3.2            1.6            2.5
    SO2  CONCENTRATION PPM                      0.0            0.0            0.0
    HC   MASS GRAMS                           23.09          25.79          19.27
    CO   MASS GRAMS                           36.04          46.59          47.73
    CO2  MASS GRAMS                          179.42         220.02         199.48
    NOX  MASS GRAMS                             .16            .13            .12
    SO2  MASS GRAMS                            0.00           0.00           0.00
    TOTAL CARBON GRAMS                        84.41         102.35          77.95

    WEIGHTED MASS HC       4.23 GRAMS/KILOMETRE
    WEIGHTED MASS CO       8.09 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     34.63 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .02 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.04 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  38.8  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST           264.70 GRAMS
    ESTIMATED FUEL WEIGHT =   .31KG.
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        TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                               VEHICLE NUMBER 100

      DATE  5/ 2/77                 TIME    -0 HRS.        TEST NO.  .
      MODEL  1976 SUZUKI TS-100 FET BASE RTN               ENGINE  .1 LITRE  1
      DRIVER   KN                   TEST WT.     0 KG.     GVW    0 KG
      WET BULB TEMP  22 C           DRY BULB TEMP  28 C    REL. HUM.  58.5 PCT
      SPEC. HUM.  14.0 GRAM/KG      BARO.  740.7 MM  HG.   MEASURED FUEL  0.00 KG

        RUN DURATION          12.77 MINUTES
        BLOWER INLET PRESS.  127.0   MM. H2O
        BLOWER DIF.  PRESS.  152.4   MM  H2O
        BLOWER INLET TEMP.      43  DEG. C
        DYNO REVOLUTIONS      4174
        DISTANCE TRAVELED   15.25  KILOMETRES
        BLOWER REVOLUTIONS     4811
        BLOWER CU. CM /REV.  8290

        BAG RESULTS
         HC   SAMPLE  METER READING/SCALE            41.4/4
         HC   SAMPLE  PPM                            4140
         HC   BACKGRD METER READING/SCALE              .4/4
         HC   BACKGRD PPM                              40
         CO   SAMPLE  METER READING/SCALE            44.1/2
         CO   SAMPLE  PPM                            6441
         CO   BACKGRD METER READING/SCALE              .1/2
         CO   BACKGRD PPM                               4
         CO2  SAMPLE  METER READING/SCALE            50.3/3
         CO2  SAMPLE  PERCENT                          .87
         CO2  BACKGRD METER READING/SCALE             3.2/3
         CO2  BACKGRD PERCENT                          .05
         NOX  SAMPLE  METER READING/SCALE            14.6/2
         NOX  SAMPLE  PPM                            14.6
         NOX  BACKGRD METER READING/SCALE              .7/2
         NOX  BACKGRD PPM                              .7
         HC   CONCENTRATION PPM                      4106
         CO   CONCENTRATION PPM                      6208
         CO2  CONCENTRATION PCT                        .83
         NOX  CONCENTRATION PPM                      14.0
         SO2  COCENTRATION PPM                       0.0
         HC   MASS (GRAMS)                          84.18
         CO   MASS (GRAMS)                         256.95
         CO2  MASS (GRAMS)                         543.19
         NOX  MASS (GRAMS)                           1.07
         SO2  MASS (GRAMS)                           0.00

      HC   GRAMS/KILOMETRE      5.52
      CO   GRAMS/KILOMETRE     16.85
      CO2  GRAMS/KILOMETRE     35.62
      NOX  GRAMS/KILOMETRE       .07
      SO2  GRAMS/KILOMETRE      0.00

      HC   GRAMS/KG OF FUEL  *9.81     HC   GRAMS/MIN   6.59
      CO   GRAMS/KG OF FUEL  671.0     CO   GRAMS/MIN   20.1
      CO2  GRAMS/KG OF FUEL   1418     CO2  GRAMS/MIN     43
      NOX  GRAMS/KG OF FUEL   2.79     NOX  GRAMS/MIN    .08
      SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
      CARBON BALANCE FUEL ECONOMY                     29.25  KILOMETRES/LITRE
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                               TABLE                         VEHICLE EMISSION RESULTS
                                                     1975  LIGHT DUTY EMISSIONS TEST
                                              DATE  5/20/77                     MFGR. CODE    -0                    YR.  1976
UNIT NO.  100         TEST NO. 1              ENGINE     .10 LITRE 1            CURB WT.      0 KG                  GVM      C KG
VEHICLE MODEL  TS100 20DEG RED
                                                                         WET BULB TEMP  20.6 DEG. C
BAROMETER 738.38 MM OF HG.                                               ABS. HUMIDITY  13.7 GRAMS/KG
DRY BULB TEMP.    25.0 DEG. C                                            DYNO ROLL CONSTANT    967.97
REL. HUMIDITY      67 PCT.

EXHAUST EMISSIONS                                                        BLOWER INLET PRESS., G1 127.0 MM. H2O
                                                                         BLOWER INLET TEMP.    43 DEG. C
    BLOWER DIF. PRESS., G2, 152.4 MM. H2O
    BAG RESULTS
    BAG NO.                                      1              2              3
    BLOWER REVOLUTIONS                        3179           5455           3169
    ROLL COUNTS                               2855           3861           2889
    HC   SAMPLE   METER READING/SCALE       17.4/4         12.0/4         16.5/4
    HC   SAMPLE   PPM                        1740           1200           1650
    HC   BACKGRD METER READING/SCALE          .2/4           .2/4           .2/4
    HC   BACKGRD PPM                           20             20             20
    CO   SAMPLE   METER READING/SCALE       61.1/3         45.5/3         29.6/3
    CO   SAMPLE   PPM                        1546           1109           2152
    CO   BACKGRD METER READING/SCALE          .1/3           .1/3           .1/3
    CO   BACKGRD PPM                            2              2              2
    CO2  SAMPLE   METER READING/SCALE       29.0/3         22.6/3         27.8/3
    CO2  SAMPLE   PERCENT                     .48            .37            .46
    CO2  BACKGRD METER READING/SCALE         3.1/3          3.1/3          3.2/3
    CO2  BACKGRD PERCENT                      .05            .05            .05
    NOX  SAMPLE   METER READING/SCALE        3.0/2          2.1/2          2.8/2
    NOX  SAMPLE   PPM                         3.0            2.1            2.8
    NOX  BACKGRD METER READING/SCALE          .5/2           .5/2           .5/2
    NOX  BACKGRD PPM                           .5             .5             .5
    SO2  SAMPLE   METER READING/SCALE      -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE   PPM                         0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE       -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                          0.0            0.0            0.0

    HC   CONCENTRATION PPM                   1721           1181           1631
    CO   CONCENTRATION PPM                   1496           1075           2084
    CO2  CONCENTRATION PCT                    .43            .32            .41
    NOX  CONCENTRATION PPM                    2.5            1.6            2.3
    SO2  CONCENTRATION PPM                    0.0            0.0            0.0
    HC   MASS GRAMS                         23.24          27.36          21.94
    CO   MASS GRAMS                         40.79          50.28          56.61
    CO2  MASS GRAMS                        186.52         236.92         176.16
    NOX  MASS GRAMS                           .13            .14            .12
    SO2  MASS GRAMS                          0.00           0.00           0.00
    TOTAL CARBON GRAMS                      88.51         109.90          91.35

    WEIGHTED MASS HC        4.45 GRAMS/KILOMETRE
    WEIGHTED MASS CO        8.94 GRAMS/KILOMETRE
    WEIGHTED MASS CO2      37.29 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        .02 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        11.20 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  36.0  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              289.76 GRAMS
    ESTIMATED FUEL WEIGHT =    .33KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMBER 100

DATE  5/20/77               TIME     -0 HRS.           TEST NO.  1
MODEL  1976 SUZUKI TS100 FFT ROTARY 20 RED.           ENGINE  .1 LITRE  1
DRIVER   KN                 TEST WT.       0 KG.       GVW    0 KG
WET BULB TEMP  19 C         DRY BULB TEMP  24 C        REL. HUM.  66.2 PCT
SPEC. HUM.  12.6 GRAM/KG    BARO.  738.1 MM  HG.       MEASURED FUEL  0.00 KG

  RUN DURATION           12.77 MINUTES
  BLOWER INLET PRESS.   127.0  MM. H2O
  BLOWER DIF.  PRESS.   147.3  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS       9672
  DISTANCE TRAVELED     16.08  KILOMETRES
  BLOWER REVOLUTIONS       4809
  BLOWER CU. CM /REV.   8315

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE              55.4/4
   HC  SAMPLE  PPM                              5540
   HC  BACKGRD METER READING/SCALE                .5/4
   HC  BACKGRD PPM                                50
   CO  SAMPLE  METER READING/SCALE              84.4/1
   CO  SAMPLE  PPM                             10912
   CO  BACKGRD METER READING/SCALE                .1/1
   CO  BACKGRD PPM                                 5
   CO2 SAMPLE  METER READING/SCALE              49.1/3
   CO2 SAMPLE  PERCENT                           .85
   CO2 BACKGRD METER READING/SCALE              3.4/3
   CO2 BACKGRD PERCENT                          .05
   NOX SAMPLE  METER READING/SCALE              8.1/2
   NOX SAMPLE  PPM                              8.1
   NOX BACKGRD METER READING/SCALE               .4/2
   NOX BACKGRD PPM                               .4
   HC  CONCENTRATION PPM                       5499
   CO  CONCENTRATION PPM                      10496
   CO2 CONCENTRATION PCT                        .81
   NOX CONCENTRATION PPM                        7.8
   SO2 COCENTRATION PPM                        0.0
   HC  MASS (GRAMS)                          112.64
   CO  MASS (GRAMS)                          434.05
   CO2 MASS (GRAMS)                          527.23
   NOX MASS (GRAMS)                             .56
   SO2 MASS (GRAMS)                            0.00

 HC  GRAMS/KILOMETRE      7.01
 CO  GRAMS/KILOMETRE     27.00
 CO2 GRAMS/KILOMETRE     32.79
 NOX GRAMS/KILOMETRE       .04
 SO2 GRAMS/KILOMETRE      0.00

 HC  GRAMS/KG OF FUEL  47.93      HC  GRAMS/MIN   8.82
 CO  GRAMS/KG OF FUEL  878.3      CO  GRAMS/MIN   34.0
 CO2 GRAMS/KG OF FUEL   1067      CO2 GRAMS/MIN     41
 NOX GRAMS/KG OF FUEL   1.14      NOX GRAMS/MIN    .04
 SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                   23.90  KILOMETRES/LITRE
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                    TABLE                      VEHICLE EMISSION RESULTS
                                         1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  100        TEST NO. 1         DATE  6/ 2/77
VEHICLE MODEL  TS100 10DEG RED          ENGINE     .10 LITRE 1          MFGR. CODE    -0                  YR.  1976
                                                                        CURR WT.       0 KG               GVW       0 KG
BAROMETER 739.39 MM OF HG.
DRY BULB TEMP.    26.1 DEG. C                                           WET BULB TEMP  20.0 DEG. C
REL. HUMIDITY      57 PCT.                                              ABS. HUMIDITY  12.4 GRAMS/KG
                                                                        DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 147.3 MM. H2O                               BLOWER INLET PRESS., G1 127.0 MM. H2O
    BAG RESULTS                                                         BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                          1              2              3
    BLOWER REVOLUTIONS                             3182           5454           3176
    ROLL COUNTS                                    2828           3872           2886
    HC    SAMPLE   METER READING/SCALE             19.9/4         12.1/4         15.4/4
    HC    SAMPLE   PPM                             1990           1210           1540
    HC    BACKGRD METER READING/SCALE               3.3/3          2.4/3          2.1/3
    HC    BACKGRD PPM                               33             24             21
    CO    SAMPLE   METER READING/SCALE             60.9/3         44.4/3         71.2/3
    CO    SAMPLE   PPM                             1540           1029           1860
    CO    BACKGRD METER READING/SCALE               .1/3           .2/3           .1/3
    CO    BACKGRD PPM                                2              4              2
    CO2   SAMPLE   METER READING/SCALE             30.1/3         24.0/3         25.5/3
    CO2   SAMPLE   PERCENT                          .50            .39            .42
    CO2   BACKGRD METER READING/SCALE               4.1/3          4.3/3          4.3/3
    CO2   BACKGRD PERCENT                           .06            .07            .07
    NOX   SAMPLE   METER READING/SCALE              5.0/2          2.9/2          3.8/2
    NOX   SAMPLE   PPM                              5.0            2.9            3.6
    NOX   BACKGRD METER READING/SCALE               .5/2           .5/2           .5/2
    NOX   BACKGRD PPM                               .5             .5             .5
    SO2   SAMPLE   METER READING/SCALE            -0.0/*         -0.0/*         -0.0/*
    SO2   SAMPLE   PPM                              0.0            0.0            0.0
    SO2   BACKGRD METER READING/SCALE             -0.0/*         -0.0/*         -0.0/*
    SO2   BACKGRD PPM                               0.0            0.0            0.0

    HC    CONCENTRATION PPM                        1959           1187           1520
    CO    CONCENTRATION PPM                        1495           1047           1809
    CO2   CONCENTRATION PCT                         .44            .33            .35
    NOX   CONCENTRATION PPM                         4.5            2.4            3.3
    SO2   CONCENTRATION PPM                         0.0            0.0            0.0
    HC    MASS GRAMS                               26.60          27.63          20.60
    CO    MASS GRAMS                               40.99          49.22          49.50
    CO2   MASS GRAMS                              189.84         242.85         152.97
    NOX   MASS GRAMS                                .22            .20            .16
    SO2   MASS GRAMS                               0.00           0.00           0.00
    TOTAL CARBON GRAMS                             92.41         111.30          80.81

    WEIGHTED MASS HC        4.53 GRAMS/KILOMETRE
    WEIGHTED MASS CO        8.47 GRAMS/KILOMETRE
    WEIGHTED MASS CO2      36.67 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        .03 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        11.23 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  36.6  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST             284.53 GRAMS
    ESTIMATED FUEL WEIGHT =    .33KG.
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       TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                             VEHICLE NUMBER 100

DATE  6/ 2/77                TIME    -0 HRS.          TEST NO.  1
MODEL  1976 SUZUKI TS100 FET ROTARY 10 HED            ENGINE  .1 LITRE  1
DRIVER   KN                  TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  21 C          DRY BULB TEMP  26 C      REL. HUM.  63.7 PCT
SPEC. HUM.  13.4 GRAM/KG     BARO.  739.4 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION          12.88 MINUTES
  BLOWER INLET PRESS.  127.0  MM. H20
  BLOWER DIF.  PRESS.  147.3  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9751
  DISTANCE TRAVELED   16.21  KILOMETRES
  BLOWER REVOLUTIONS     4853
  BLOWER CU. CM /REV.  8316

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                58.4/4
   HC  SAMPLE  PPM                                5840
   HC  BACKGRD METER READING/SCALE                 3.7/3
   HC  BACKGRD PPM                                  37
   CO  SAMPLE  METER READING/SCALE                85.4/1
   CO  SAMPLE  PPM                               11212
   CO  BACKGRD METER READING/SCALE                  .1/1
   CO  BACKGRD PPM                                   5
   CO2 SAMPLE  METER READING/SCALE                51.3/3
   CO2 SAMPLE  PERCENT                              .89
   CO2 BACKGRD METER READING/SCALE                 2.8/3
   CO2 BACKGRD PERCENT                              .04
   NOX SAMPLE  METER READING/SCALE                10.2/2
   NOX SAMPLE  PPM                                10.2
   NOX BACKGRD METER READING/SCALE                  .3/2
   NOX BACKGRD PPM                                  .3
   HC  CONCENTRATION PPM                         5810
   CO  CONCENTRATION PPM                        10785
   CO2 CONCENTRATION PCT                           .86
   NOX CONCENTRATION PPM                         10.0
   SO2 COCENTRATION PPM                           0.0
   HC  MASS (GRAMS)                            120.33
   CO  MASS (GRAMS)                            450.95
   CO2 MASS (GRAMS)                            566.32
   NOX MASS (GRAMS)                               .75
   SO2 MASS (GRAMS)                              0.00

HC  GRAMS/KILOMETRE      7.42
CO  GRAMS/KILOMETRE     27.82
CO2 GRAMS/KILOMETRE     34.94
NOX GRAMS/KILOMETRE       .05
SO2 GRAMS/KILOMETRE      0.00

HC  GRAMS/KG OF FUEL  40.26     HC  GRAMS/MIN    9.34
CO  GRAMS/KG OF FUEL  862.9     CO  GRAMS/MIN   35.0
CO2 GRAMS/KG OF FUEL   1084     CO2 GRAMS/MIN     44
NOX GRAMS/KG OF FUEL   1.44     NOX GRAMS/MIN    .06
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                     22.79  KILOMETRES/LITRE
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                    TABLE                    VEHICLE EMISSION RESULTS
                                         1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  100        TEST NO. 1          DATE  6/13/77                     MFGR. CODE    -0                YR.  1976
VEHICLE MODEL  TS-100 ST.VL.LEAN+CDI     ENGINE     .10 LITRE 1            CURB WT.       0 KG             GVW      0 KG

BAROMETER 739.14 MM OF HG.                                                 WET BULB TEMP  18.3 DEG. C
DRY BULB TEMP.    25.0 DEG. C                                              ABS. HUMIDITY  10.7 GRAMS/KG
REL. HUMIDITY      53 PCT.                                                 DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                           BLOWER INLET PRESS., G1 124.5 MM. H2O
    BLOWER DIF. PRESS., G2, 144.8 MM. H2O                                  BLOWER INLET TEMP.    43 DEG. C
    RAG RESULTS
    BAG NO.                                   1              2              3
    BLOWER REVOLUTIONS                     3207           5463           3200
    ROLL COUNTS                             2837           3825           2847
    HC    SAMPLE  METER READING/SCALE      21.8/4         12.4/4         15.8/4
    HC    SAMPLE  PPM                      2180           1240           1580
    HC    BACKGRD METER READING/SCALE        .4/4           .3/4           .1/4
    HC    BACKGRD PPM                        40             30             10
    CO    SAMPLE  METER READING/SCALE      84.8/*         57.1/*         63.8/*
    CO    SAMPLE  PPM                       400            224            261
    CO    BACKGRD METER READING/SCALE        .7/*           .9/*           .4/*
    CO    BACKGRD PPM                         2              3              1
    CO2   SAMPLE  METER READING/SCALE      32.4/3         25.4/3         30.7/3
    CO2   SAMPLE  PERCENT                   .54            .41            .51
    CO2   BACKGRD METER READING/SCALE      3.6/3          3.6/3          2.6/3
    CO2   BACKGRD PERCENT                   .06            .06            .04
    NOX   SAMPLE  METER READING/SCALE      8.8/2          4.3/2         10.2/2
    NOX   SAMPLE  PPM                      8.8            4.3           10.2
    NOX   BACKGRD METER READING/SCALE        .5/2           .3/2           .5/2
    NOX   BACKGRD PPM                        .5             .3             .5
    SO2   SAMPLE  METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
    SO2   SAMPLE  PPM                      0.0            0.0            0.0
    SO2   BACKGRD METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
    SO2   BACKGRD PPM                      0.0            0.0            0.0

    HC    CONCENTRATION PPM                2142           1211           1571
    CO    CONCENTRATION PPM                 387            216            253
    CO2   CONCENTRATION PCT                 .49            .36            .47
    NOX   CONCENTRATION PPM                8.3            4.0            9.7
    SO2   CONCENTRATION PPM                0.0            0.0            0.0
    HC    MASS GRAMS                      29.37          28.28          21.48
    CO    MASS GRAMS                      10.70          10.19           6.97
    CO2   MASS GRAMS                     212.75         269.28         205.18
    NOX   MASS GRAMS                        .38            .31            .44
    SO2   MASS GRAMS                       0.00           0.00           0.00
    TOTAL CARBON GRAMS                    88.07         102.35          77.58

    WEIGHTED MASS HC       4.80 GRAMS/KILOMETRE
    WEIGHTED MASS CO       1.69 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     43.10 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .07 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.09 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  38.5  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              268.00 GRAMS
    ESTIMATED FUEL WEIGHT =   .31KG.
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        TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                                VEHICLE NUMBER 100

DATE  6/13/77                  TIME     -0 HRS.          TEST NO.  1
MODEL  1976 SUZUKI TS-100 FET ST.VL.LEAN+CDI            ENGINE  .1 LITRE  1
DRIVER   KN                    TEST WT.      0 KG.       GVW     0 KG
WET BULB TEMP  22 C            DRY BULB TEMP  27 C       REL. HUM.  64.5 PCT
SPEC. HUM.  14.5 GRAM/KG       BARO.  740.4 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION            12.77 MINUTES
  BLOWER INLET PRESS.   127.0  MM. H2O
  BLOWER DIF.  PRESS.   169.0  MM  H2O
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS        8407
  DISTANCE TRAVELED    13.97  KILOMETRES
  BLOWER REVOLUTIONS      4791
  BLOWER CU. CM /REV.   8245

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE            24.0/4
   HC   SAMPLE  PPM                            2400
   HC   BACKGRD METER READING/SCALE              .1/4
   HC   BACKGRD PPM                              10
   CO   SAMPLE  METER READING/SCALE            92.6/*
   CO   SAMPLE  PPM                             466
   CO   BACKGRD METER READING/SCALE              .4/*
   CO   BACKGRD PPM                               1
   CO2  SAMPLE  METER READING/SCALE            55.5/3
   CO2  SAMPLE  PERCENT                         .97
   CO2  BACKGRD METER READING/SCALE             4.2/3
   CO2  BACKGRD PERCENT                         .06
   NOX  SAMPLE  METER READING/SCALE            25.3/2
   NOX  SAMPLE  PPM                            25.3
   NOX  BACKGRD METER READING/SCALE              .1/2
   NOX  BACKGRD PPM                              .1
   HC   CONCENTRATION PPM                      2391
   CO   CONCENTRATION PPM                       446
   CO2  CONCENTRATION PCT                       .92
   NOX  CONCENTRATION PPM                      25.2
   SO2  COCENTRATION PPM                        0.0
   HC   MASS (GRAMS)                          48.53
   CO   MASS (GRAMS)                          18.28
   CO2  MASS (GRAMS)                         592.62
   NOX  MASS (GRAMS)                           1.94
   SO2  MASS (GRAMS)                           0.00

HC   GRAMS/KILOMETRE      3.47
CO   GRAMS/KILOMETRE      1.31
CO2  GRAMS/KILOMETRE     42.41
NOX  GRAMS/KILOMETRE       .14
SO2  GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL   48.42     HC   GRAMS/MIN    3.80
CO   GRAMS/KG OF FUEL    24.8     CO   GRAMS/MIN     1.4
CO2  GRAMS/KG OF FUEL    2423     CO2  GRAMS/MIN      46
NOX  GRAMS/KG OF FUEL    2.93     NOX  GRAMS/MIN     .15
SO2  GRAMS/KG OF FUEL    0.00     SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                        41.97  KILOMETRES/LITRE
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                         TABLE                    VEHICLE EMISSION RESULTS
                                            1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  100        TEST NO. 2        DATE  6/14/77                   MFGR. CODE   -0                 YR.  1976
VEHICLE MODEL  TS-100 ST.VL.LEAN+CDI   ENGINE    .10 LITRE 1           CURB WT.     0 KG               GVW     0 KG

BAROMETER 740.92 MM OF HG.                                          WET BULB TEMP  21.1 DEG. C
DRY BULB TEMP.    26.1 DEG. C                                       ABS. HUMIDITY  13.9 GRAMS/KG
REL. HUMIDITY      64 PCT.                                          DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS                                                   BLOWER INLET PRESS., G1 127.0 MM. H2O
                                                                    BLOWER INLET TEMP.   43 DEG. C
    BLOWER DIF. PRESS., G2, 157.5 MM. H2O
    BAG RESULTS
    BAG NO.                                    1              2              3
    BLOWER REVOLUTIONS                      3175           5455           3172
    ROLL COUNTS                             2869           3807           2915
    HC   SAMPLE  METER READING/SCALE      20.7/4         12.3/4         14.6/4
    HC   SAMPLE  PPM                        2070           1230           1460
    HC   BACKGRD METER READING/SCALE         .1/4           .1/4           .2/4
    HC   BACKGRD PPM                          10             10             20
    CO   SAMPLE  METER READING/SCALE      84.5/*         59.3/*         67.5/*
    CO   SAMPLE  PPM                         397            236            282
    CO   BACKGRD METER RE DING/SCALE       1.0/*          1.6/*          1.0/*
    CO   BACKGRD PPM                           3              5              3
    CO2  SAMPLE  METER READING/SCALE      32.0/3         24.9/3         31.1/3
    CO2  SAMPLE  PERCENT                     .53            .41            .52
    CO2  BACKGRD METER READING/SCALE       3.6/3          2.8/3          2.9/3
    CO2  BACKGRD PERCENT                     .06            .04            .04
    NOX  SAMPLE  METER READING/SCALE       7.3/2          4.2/2         11.0/2
    NOX  SAMPLE  PPM                         7.3            4.2           11.0
    NOX  BACKGRD METER READING/SCALE        .7/2           .5/2           .6/2
    NOX  BACKGRD PPM                          .7             .5             .6
    SO2  SAMPLE  METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                         0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                         0.0            0.0            0.0

    HC   CONCENTRATION PPM                  2061           1220           1441
    CO   CONCENTRATION PPM                   382            225            271
    CO2  CONCENTRATION PCT                   .48            .36            .47
    NOX  CONCENTRATION PPM                   6.6            3.7           10.4
    SO2  CONCENTRATION PPM                   0.0            0.0            0.0
    HC   MASS GRAMS                        27.80          28.29          19.43
    CO   MASS GRAMS                        10.41          10.52           7.37
    CO2  MASS GRAMS                       206.27         269.65         203.40
    NOX  MASS GRAMS                          .33            .32            .52
    SO2  MASS GRAMS                         0.00           0.00           0.00
    TOTAL CARBON GRAMS                     84.82         102.59          75.48

    WEIGHTED MASS HC       4.61 GRAMS/KILOMETRE
    WEIGHTED MASS CO       1.72 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     42.57 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .07 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.14 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  39.2  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST           262.90 GRAMS
    ESTIMATED FUEL WEIGHT =   .30KG.
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        TABLE           EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                                 VEHICLE NUMBER 100

DATE  6/14/77                   TIME     -0 HRS.          TEST NO.  2
MODEL  1976 SUZUKI TS-100 FET ST.VL.LEAN+CDI              ENGINE  .1 LITRE  1
DRIVER   KN                     TEST WT.       0 KG.      GVW     0 KG
WET BULB TEMP  20 C             DRY BULB TEMP  26 C       REL. HUM.  60.1 PCT
SPEC. HUM.  12.6 GRAM/KG        BARO.  743.2 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.  124.5  MM. H2O
  BLOWER DIF.  PRESS.  144.9  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      7949
  DISTANCE TRAVELED   13.21  KILOMETRES
  BLOWER REVOLUTIONS     4805
  BLOWER CU. CM /REV.  8306

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                23.9/4
   HC   SAMPLE  PPM                                2390
   HC   BACKGRD METER READING/SCALE                  .1/4
   HC   BACKGRD PPM                                  10
   CO   SAMPLE  METER READING/SCALE                69.7/*
   CO   SAMPLE  PPM                                 295
   CO   BACKGRD METER READING/SCALE                  .5/*
   CO   BACKGRD PPM                                   1
   CO2 SAMPLE  METER READING/SCALE                 53.1/3
   CO2 SAMPLE  PERCENT                              .93
   CO2 BACKGRD METER READING/SCALE                  3.1/3
   CO2 BACKGRD PERCENT                              .05
   NOX SAMPLE  METER READING/SCALE                 35.6/2
   NOX SAMPLE  PPM                                 35.6
   NOX BACKGRD METER READING/SCALE                  .7/2
   NOX BACKGRD PPM                                  .7
   HC   CONCENTRATION PPM                          2381
   CO   CONCENTRATION PPM                           283
   CO2 CONCENTRATION PCT                            .88
   NOX CONCENTRATION PPM                           35.0
   SO2 COCENTRATION PPM                            0.0
   HC   MASS (GRAMS)                              49.03
   CO   MASS (GRAMS)                              11.76
   CO2 MASS (GRAMS)                              580.44
   NOX MASS (GRAMS)                               2.54
   SO2 MASS (GRAMS)                               0.00

 HC   GRAMS/KILOMETRE       3.71
 CO   GRAMS/KILOMETRE        .89
 CO2 GRAMS/KILOMETRE      43.93
 NOX GRAMS/KILOMETRE        .19
 SO2 GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  46.00     HC   GRAMS/MIN   3.84
 CO   GRAMS/KG OF FUEL   49.4     CO   GRAMS/MIN     .9
 CO2 GRAMS/KG OF FUEL   2439     CO2 GRAMS/MIN     45
 NOX GRAMS/KG OF FUEL  10.69     NOX GRAMS/MIN    .20
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                     40.78  KILOMETRES/LITRE
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                    TABLE                         VEHICLE EMISSION RESULTS
                                             1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  100        TEST NO. 1          DATE  8/24/77                         MFGR. CODE   -0                    YR.  1976
VEHICLE MODEL  T8100 LN+CAT+AIR+CDI      ENGINE     .10 LITRE 1                CURB WT.      0 KG                 GVM      0 KG

BAROMETER 738.12 MM OF HG.                                               WET BULB TEMP  21.1 DEG. C
DRY BULB TEMP.    28.9 DEG. C                                            ABS. HUMIDITY  12.8 GRAMS/KG
REL. HUMIDITY      50 PCT.                                               DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                         BLOWER INLET PRESS., G1 127.0 MM. H2O
   BLOWER DIF. PRESS., G2, 152.4 MM. H2O                                 BLOWER INLET TEMP.   43 DEG. C
   BAG RESULTS
   BAG NO.                                        1               2               3
   BLOWER REVOLUTIONS                          3233            5450            3180
   ROLL COUNTS                                  2780            3720            2788
   HC    SAMPLE  METER READING/SCALE          84.9/3          22.0/3          33.7/3
   HC    SAMPLE  PPM                            849             220             337
   HC    BACKGRD METER READING/SCALE           1.2/3           1.4/3           1.6/3
   HC    BACKGRD PPM                             12              14              16
   CO    SAMPLE  METER READING/SCALE          29.6/3          35.6/*          61.3/*
   CO    SAMPLE  PPM                            696              33             247
   CO    BACKGRD METER READING/SCALE            .1/3            .6/*            .4/*
   CO    BACKGRD PPM                              2               1               1
   CO2   SAMPLE  METER READING/SCALE          43.0/3          33.2/3          34.5/3
   CO2   SAMPLE  PERCENT                        .73             .55             .67
   CO2   BACKGRD METER READING/SCALE           3.9/3           3.1/3           3.6/3
   CO2   BACKGRD PERCENT                        .06             .05             .06
   NOX   SAMPLE  METER READING/SCALE          12.4/2          11.8/2          17.8/2
   NOX   SAMPLE  PPM                           12.4            11.8            17.8
   NOX   BACKGRD METER READING/SCALE           3.5/2           4.3/2           7.9/2
   NOX   BACKGRD PPM                            3.5             4.3             7.9
   SO2   SAMPLE  METER READING/SCALE          -0.0/*          -0.0/*          -0.0/*
   SO2   SAMPLE  PPM                            0.0             0.0             0.0
   SO2   BACKGRD METER READING/SCALE          -0.0/*          -0.0/*          -0.0/*
   SO2   BACKGRD PPM                            0.0             0.0             0.0

   HC    CONCENTRATION PPM                      838             207             322
   CO    CONCENTRATION PPM                      673              31             239
   CO2   CONCENTRATION PCT                      .68             .51             .62
   NOX   CONCENTRATION PPM                      9.1             7.7            10.3
   SO2   CONCENTRATION PPM                      0.0             0.0             0.0
   HC    MASS GRAMS                           11.50            4.78            4.35
   CO    MASS GRAMS                           18.66            1.45            6.52
   CO2   MASS GRAMS                          296.68          374.54          265.29
   NOX   MASS GRAMS                             .45             .63             .50
   SO2   MASS GRAMS                            0.00            0.00            0.00
   TOTAL CARBON GRAMS                         98.92          106.96           78.96

   WEIGHTED MASS HC        1.13 GRAMS/KILOMETRE
   WEIGHTED MASS CO        1.22 GRAMS/KILOMETRE
   WEIGHTED MASS CO2      60.42 GRAMS/KILOMETRE
   WEIGHTED MASS NOX        .10 GRAMS/KILOMETRE
   WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE       .10.81 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  35.6  KILOMEIRE/LITRE
   TOTAL CARBON EXHAUST             284.86 GRAMS
   ESTIMATED FUEL WEIGHT =    .33KG.
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        TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                               VEHICLE NUMBER 100

DATE  8/25/77                    TIME     -0 HRS.         TEST NO.  1
MODEL  1976 SUZUKI TS-100 FET LN+CAT+AIR +CDI             ENGINE  .1 LITRE  1
DRIVER   KN                      TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  22 C             DRY BULB TEMP  27 C      REL. HUM.  61.4 PCT
SPEC. HUM.  14.3 GRAM/KG        BARO.  739.9 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION            12.77 MINUTES
  BLOWER INLET PRESS.  127.0  MM. H2O
  BLOWER DIF.  PRESS.  152.4  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10708
  DISTANCE TRAVELED    17.80  KILOMETRES
  BLOWER REVOLUTIONS     4810
  BLOWER CU. CM /REV.  8290

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                15.3/4
   HC   SAMPLE  PPM                                1530
   HC   BACKGRD METER READING/SCALE                  .3/4
   HC   BACKGRD PPM                                  30
   CO   SAMPLE  METER READING/SCALE                70.0/1
   CO   SAMPLE  PPM                                7490
   CO   BACKGRD METER READING/SCALE                  .1/1
   CO   BACKGRD PPM                                   5
   CO2 SAMPLE   METER READING/SCALE                73.4/3
   CO2 SAMPLE   PERCENT                            1.33
   CO2 BACKGRD METER READING/SCALE                  3.3/3
   CO2 BACKGRD PERCENT                              .05
   NOX SAMPLE   METER READING/SCALE                13.7/2
   NOX SAMPLE   PPM                                13.7
   NOX BACKGRD METER READING/SCALE                  2.3/2
   NOX BACKGRD PPM                                  2.3
   HC   CONCENTRATION PPM                          1505
   CO   CONCENTRATION PPM                          7194
   CO2 CONCENTRATION PCT                           1.29
   NOX CONCENTRATION PPM                           11.8
   SO2 COCENTRATION PPM                            0.0
   HC   MASS (GRAMS)                              30.81
   CO   MASS (GRAMS)                             295.34
   CO2 MASS (GRAMS)                              843.13
   NOX MASS (GRAMS)                                .91
   SO2 MASS (GRAMS)                               0.00

HC   GRAMS/KILOMETRE      1.73
CO   GRAMS/KILOMETRE     16.59
CO2 GRAMS/KILOMETRE      47.37
NOX GRAMS/KILOMETRE        .05
SO2 GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL  69.52     HC   GRAMS/MIN   2.41
CO   GRAMS/KG OF FUEL  666.3     CO   GRAMS/MIN   23.1
CO2 GRAMS/KG OF FUEL   1902      CO2 GRAMS/MIN     66
NOX GRAMS/KG OF FUEL   2.05      NOX GRAMS/MIN    .07
SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                   29.50  KILOMETRES/LITRE
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                        TABLE
                                                        VEHICLE EMISSION RESULTS
UNIT NO.  100        TEST NO. 2                1975  LIGHT DUTY EMISSIONS TEST
VEHICLE MODEL  TS100 LN+CAT+AIR+CDI    DATE  8/25/77
                                       ENGINE     .10 LITRE 1          MFGR. CODE   -0                     YR.  1976
                                                                       CURB WT.      0 KG                  GVM      0 KG
BAROMETER 739.90 MM OF HG.
DRY BULB TEMP.    26.7 DEG. C
REL. HUMIDITY       61 PCT.                                       WET BULB TEMP  21.1 DEG. C
                                                                  ABS. HUMIDITY  13.7 GRAMS/KG
EXHAUST EMISSIONS                                                 DYNO ROLL CONSTANT    967.97

    BLOWER DIF. PRESS., G2, 152.4 MM. H2O                         BLOWER INLET PRESS., G1 127.0 MM. H2O
    BAG RESULTS                                                   BLOWER INLET TEMP.    43 DEG. C
    BAG NO.
    BLOWER REVOLUTIONS                           1             2             3
    ROLL COUNTS                                3183          5458
    HC    SAMPLE  METER READING/SCALE           2777          3716          3178
    HC    SAMPLE  PPM                         97.3/3        25.4/3          2787
    HC    BACKGRD METER READING/SCALE            973           254        32.9/3
    HC    BACKGRD PPM                          1.5/3         1.7/3           329
    CO    SAMPLE  METER READING/SCALE             15            17         2.0/3
    CO    SAMPLE  PPM                         71.3/*        26.9/*            20
    CO    BACKGRD METER READING/SCALE            307            24        69.6/*
    CO    BACKGRD PPM                           .6/*         1.0/*           157
    CO2   SAMPLE  METER READING/SCALE              2             1          .4/*
    CO2   SAMPLE  PERCENT                     42.7/3        35.0/3             1
    CO2   BACKGRD METER READING/SCALE            .73           .59        38.0/3
    CO2   BACKGRD PERCENT                      4.2/3         4.2/3           .64
    NOX   SAMPLE  METER READING/SCALE            .06           .06         3.9/3
    NOX   SAMPLE  PPM                          9.5/2        10.2/2           .06
    NOX   BACKGRD METER READING/SCALE            9.5          10.2        11.0/2
    NOX   BACKGRD PPM                          1.2/2         2.6/2          11.0
    SO2   SAMPLE  METER READING/SCALE            1.2           2.6         3.3/2
    SO2   SAMPLE  PPM                         -0.0/*        -0.0/*           3.3
    SO2   BACKGRD METER READING/SCALE            0.0           0.0        -0.0/*
    SO2   BACKGRD PPM                         -0.0/*        -0.0/*           0.0
                                                 0.0           0.0        -0.0/*
                                                                             0.0
   HC    CONCENTRATION PPM
   CO    CONCENTRATION PPM                       959           238           310
   CO2   CONCENTRATION PCT                       245            23           152
   NOX   CONCENTRATION PPM                       .67           .52           .58
   SO2   CONCENTRATION PPM                       8.4           7.7           7.9
   HC    MASS GRAMS                              0.0           0.0           0.0
   CO    MASS GRAMS                            12.99          5.52          4.19
   CO2   MASS GRAMS                             8.07          1.07          4.14
   NOX   MASS GRAMS                           288.54        308.34        251.92
   SO2   MASS GRAMS                              .42           .66           .39
   TOTAL CARBON GRAMS                           0.00          0.00          0.00
                                               93.46        111.23         74.16
   WEIGHTED MASS HC        1.25 GRAMS/KILOMETRE
   WEIGHTED MASS CO         .64 GRAMS/KILOMETRE
   WEIGHTED MASS CO2      60.73 GRAMS/KILOMETRE
   WEIGHTED MASS NOX        .10 GRAMS/KILOMETRE
   WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE        10.80 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  35.7  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST                278.84 GRAMS
   ESTIMATED FUEL WEIGHT =    .32KG.
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        TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 100

DATE  8/25/77                  TIME    -0 HRS.          TEST NO.  2
MODEL  1976 SUZUKI TS-100 FET LN+CAT+AIR +CDI          ENGINE  .1 LITRE  1
DRIVER   KN                    TEST WT.      0 KG.      GVW     0 KG
WET BULB TEMP  21 C            DRY BULB TEMP  27 C      REL. HUM.  58.0 PCT
SPEC. HUM.  13.5 GRAM/KG       BARO.  740.4 MM  HG.     MEASURED FUEL  0.00 KG

 RUN DURATION              12.75 MINUTES
 BLOWER INLET PRESS.  127.0  MM. H2O
 BLOWER DIF.  PRESS.  152.4  MM  H2O
 BLOWER INLET TEMP.      43  DEG. C
 DYNO REVOLUTIONS     10711
 DISTANCE TRAVELED    17.80  KILOMETRES
 BLOWER REVOLUTIONS      4804
 BLOWER CU. CM /REV.  8290

 BAG RESULTS
  HC   SAMPLE  METER READING/SCALE                      14.3/4
  HC   SAMPLE  PPM                                      1430
  HC   BACKGRD METER READING/SCALE                        .3/4
  HC   BACKGRD PPM                                        30
  CO   SAMPLE  METER READING/SCALE                      64.5/1
  CO   SAMPLE  PPM                                      7393
  CO   BACKGRD METER READING/SCALE                        .1/1
  CO   BACKGRD PPM                                         5
  CO2  SAMPLE  METER READING/SCALE                      76.0/3
  CO2  SAMPLE  PERCENT                                  1.39
  CO2  BACKGRD METER READING/SCALE                       4.1/3
  CO2  BACKGRD PERCENT                                   .06
  NOX  SAMPLE  METER READING/SCALE                      14.3/2
  NOX  SAMPLE  PPM                                      14.3
  NOX  BACKGRD METER READING/SCALE                       1.7/2
  NOX  BACKGRD PPM                                       1.7
  HC   CONCENTRATION PPM                                1405
  CO   CONCENTRATION PPM                                7053
  CO2  CONCENTRATION PCT                                1.33
  NOX  CONCENTRATION PPM                                12.9
  SO2  COCENTRATIOR PPM                                 0.0
  HC   MASS (GRAMS)                                    28.75
  CO   MASS (GRAMS)                                   291.42
  CO2  MASS (GRAMS)                                   870.91
  NOX  MASS (GRAMS)                                      .96
  SO2  MASS (GRAMS)                                     0.00

 HC   GRAMS/KILOMETRE       1.61
 CO   GRAMS/KILOMETRE      16.37
 CO2  GRAMS/KILOMETRE      48.92
 NOX  GRAMS/KILOMETRE        .05
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  64.18     HC   GRAMS/MIN   2.25
 CO   GRAMS/KG OF FUEL  650.5     CO   GRAMS/MIN  22.8
 CO2  GRAMS/KG OF FUEL   1944     CO2  GRAMS/MIN    68
 NOX  GRAMS/KG OF FUEL   2.15     NOX  GRAMS/MIN   .08
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN  0.00
 CARBON BALANCE FUEL ECONOMY                   29.19  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki GT-750

Date 1/27/77 Sequence GTS-1 Baseline - Stock

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO2, %	O2, %	NO, ppm	FID HC, ppm C
Idle	N	1100	----	2.48	3.30	13.9	10.	67,200
20	2	2200	0.49	2.02	7.83	8.9	9.	42,400
30	3	2500	1.12	3.48	7.37	8.0	11.	51,200
40	4	2750	2.13	1.49	9.49	7.0	10.	34,000
50	5	2900	3.39	1.91	9.68	6.4	29.	35,600
60	5	3500	4.90	2.12	10.34	5.3	100.	32,000
Idle	N	1250	----	1.95	3.81	13.5	11.	61,600

Notes: Timing checked, ok, jet needle clip position #4 (stock), pilot fuel screw L to R: 1, 1 1/4, 3/4. Vacuum L to R: 2.4, 2.4, 2.6 in Hg. Max.head temp at 60 mph approx. 130°C; max.gas temp at 60 mph approx. 545°C

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki GT-750

Date 1/27/77 Sequence GTS-2 1st Step Lean + CDI installed

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO2, %	O2, %	NO, ppm	FID HC, ppm C
Idle	N	1150	----	0.18	4.60	14.8	5.	50,400
20	2	2250	0.48	1.00	8.11	9.9	7.	44,800
30	3	2500	1.14	2.34	9.18	7.8	7.	41,600
40	4	2750	2.12	1.63	10.71	6.7	8.	34,400
50	5	2900	3.52	0.12	10.77	7.6	44.	33,400
60	5	3500	5.19	0.12	11.72	6.5	210.	29,600
Idle	N	1200	----	0.18	4.35	14.5	5.	51,400

Notes: Jet needle clip position #2 which is second position from top. Pilot fuel screw: 1/2 turn out from bottom. Max head temp. at 60 mph approx. 130°C; Max gas temp at 60 mph 570°C

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki GT-750

Date 7/21/77 Sequence GTS-3

Condition				Concentrations					
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	
Idle	N	1250	--	0.70	10.12	7.3	--	2,160	
20	2	2250	0.54	1.09	12.87	3.3	1.8	2,500	"bucking"
30	3	2600	1.21	1.49	13.17	2.5	2.0	4,280	
40	4	2750	2.14	1.00	13.87	1.8	2.1	9,840	
50	5	2950	3.41	0.06	13.38	3.1	105.	1,770	
60	5	3500	4.90	0.06	14.29	2.0	355.	2,360	
Idle	N	1350	--	0.29	10.55	6.7	2.4	1,660	

Notes: Carburetors: lean, CDI installed, Catalysts, 3, PTX 314 Corning substrate
No air addition
Max. head temp at 60 mph 120°C: Max. gas temp. 550°C
Max. catalyst exit temp. 700°C at 60 mph. Max. catalyst inlet temp. 450°C

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki GT-750

Date 7/29/77 Sequence GTS-4

Condition				Concentrations					Temperature, °C		Air Injection cfm
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C	Enter Cat.	Exit Cat.	
Idle	N	1250	--	0.008	10.60	8.6	9.	1,580	195	500	0.94
20	2	2200	0.52	0.011	12.68	5.6	30.	1,460	205	610	1.62
30	3	2500	1.20	0.008	13.49	5.5	23.	680	220	600	1.85
40	4	2650	2.14	0.69	15.50	2.3	13.	1,620	270	640	1.97
50	5	2800	3.35	0.19	14.66	3.8	65.	1,600	330	650	2.01
60	5	3250	4.86	0.022	11.95	4.0	270.	1,900	470	700	2.30
Idle	N	1300	--	0.011	10.70	8.3	11.	1,600	205	580	0.94

Notes: Lean Carburetors, Catalyst PTX No. 314 (1 inch Torvex + 3 inch Corning), CDI
Air Injection (Pump No. 1533 at 1.87:1 pump : crankshaft)
Max. head temp. 120°C at 60 mph
W.O.T. accel 0-100 kph = 8.6 sec

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                    TABLE                         VEHICLE EMISSION RESULTS
                                             1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  700        TEST NO. 1          DATE 10/18/76                 MFGR. CODE   -0                    YR.  1976
VEHICLE MODEL  SUZKI GT750               ENGINE      .75 LITRE 3       CURB WT.      0 KG                 GVM      0 KG

BAROMETER 744.73 MM OF HG.                                          WET BULB TEMP  17.2 DEG. C
DRY BULB TEMP.    26.7 DEG. C                                       ABS. HUMIDITY   8.5 GRAMS/KG
REL. HUMIDITY      38 PCT.                                          DYNO ROLL CONSTANT    967.67

EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 477.5 MM. H2O                           BLOWER INLET PRESS., G1 452.1 MM. H2O
    BAG RESULTS                                                     BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                    1                2                  3
    BLOWER REVOLUTIONS                       6273             10779               6285
    ROLL COUNTS                               3499             3659                3411
    HC   SAMPLE  METER READING/SCALE         39.4/4           21.2/4              25.2/4
    HC   SAMPLE  PPM                         3940             2120                2520
    HC   BACKGRD METER READING/SCALE          1.8/3            1.0/3               2.7/3
    HC   BACKGRD PPM                           18               10                  27
    CO   SAMPLE  METER READING/SCALE         58.6/3           40.5/3              40.4/3
    CO   SAMPLE  PPM                         1973              976                 974
    CO   BACKGRD METER READING/SCALE           .8/3             .5/3                .5/3
    CO   BACKGRD PPM                           17               11                  11
    CO2  SAMPLE  METER READING/SCALE         36.4/3           21.7/3              32.4/3
    CO2  SAMPLE  PERCENT                      .61              .35                 .54
    CO2  BACKGRD METER READING/SCALE          3.3/3            3.8/3               2.7/3
    CO2  BACKGRD PERCENT                      .05              .06                 .04
    NOX  SAMPLE  METER READING/SCALE          4.0/2            1.6/2               4.3/2
    NOX  SAMPLE  PPM                          4.0              1.6                 4.3
    NOX  BACKGRD METER READING/SCALE          1.0/2             .7/2               1.1/2
    NOX  BACKGRD PPM                          1.0               .7                 1.1
    SO2  SAMPLE  METER READING/SCALE        -0.0/*            -0.0/*              -0.0/*
    SO2  SAMPLE  PPM                          0.0              0.0                 0.0
    SO2  BACKGRD METER READING/SCALE        -0.0/*            -0.0/*              -0.0/*
    SO2  BACKGRD PPM                          0.0              0.0                 0.0

    HC   CONCENTRATION PPM                   3923             2110                2495
    CO   CONCENTRATION PPM                   1922              948                 942
    CO2  CONCENTRATION PCT                    .56              .30                 .50
    NOX  CONCENTRATION PPM                    3.1               .9                 3.3
    SO2  CONCENTRATION PPM                    0.0              0.0                 0.0
    HC   MASS GRAMS                          87.10            92.21               63.60
    CO   MASS GRAMS                          73.03            83.58               48.46
    CO2  MASS GRAMS                         458.27           411.23              406.51
    NOX  MASS GRAMS                           .24              .13                 .26
    SO2  MASS GRAMS                          0.00             0.00                0.00
    TOTAL CARBON GRAMS                      231.78           227.89              186.78

    WEIGHTED MASS HC      14.08 GRAMS/KILOMETRE
    WEIGHTED MASS CO      12.10 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     71.29 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .03 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.78 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  17.4  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              646.44 GRAMS
    ESTIMATED FUEL WEIGHT =   .75KG.
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TABLE              EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 700
DATE 10/18/76
MODEL   1976 SUZUKI GT750   TIME       -0 HRS.
DRIVER    JT                HIWAY CYCLE               TEST NO.  1
WET BULB TEMP  18 C         TEST WT.        0 KG.     ENGINE   .8 LITRE  3
SPEC. HUM.    8.9 GRAM/KG   DRY BULB TEMP   27 C      GVW      0 KG
                            BARO.  744.7 MM  HG.      REL. HUM.   38.8 PCT
 RUN DURATION               12.75 MINUTES             MEASURED FUEL  0.00 KG
 BLOWER INLET PRESS.    452.1  MM. H20
 BLOWER DIF.  PRESS.    477.5  MM  H20
 BLOWER INLET TEMP.        43  DEG. C
 DYNO REVOLUTIONS        9900
 DISTANCE TRAVELED      16.46  KILOMETRES
 BLOWER REVOLUTIONS       9537
 BLOWER CU. CM /REV.   8119

 BAG RESULTS
  HC   SAMPLE  METER READING/SCALE          32.5/4
  HC   SAMPLE  PPM                          3250
  HC   BACKGRD METER READING/SCALE           3.1/3
  HC   BACKGRD PPM                            31
  CO   SAMPLE  METER READING/SCALE          69.5/3
  CO   SAMPLE  PPM                          1805
  CO   BACKGRD METER READING/SCALE            .5/3
  CO   BACKGRD PPM                            11
  CO2  SAMPLE  METER READING/SCALE          53.1/3
  CO2  SAMPLE  PERCENT                       .93
  CO2  BACKGRD METER READING/SCALE          1.9/3
  CO2  BACKGRD PERCENT                       .03
  NOX  SAMPLE  METER READING/SCALE          7.0/2
  NOX  SAMPLE  PPM                          7.0
  NOX  BACKGRD METER READING/SCALE          1.2/2
  NOX  BACKGRD PPM                          1.2
  HC   CONCENTRATION PPM                    3222
  CO   CONCENTRATION PPM                    1740
  CO2  CONCENTRATION PCT                     .90
  NOX  CONCENTRATION PPM                    5.9
  SO2  COCENTRATION PPM                     0.0
  HC   MASS (GRAMS)                       124.78
  CO   MASS (GRAMS)                       136.07
  CO2  MASS (GRAMS)                      1112.89
  NOX  MASS (GRAMS)                          .72
  SO2  MASS (GRAMS)                         0.00

 HC   GRAMS/KILOMETRE      7.58
 CO   GRAMS/KILOMETRE      8.27
 CO2  GRAMS/KILOMETRE     67.63
 NOX  GRAMS/KILOMETRE       .04
 SO2  GRAMS/KILOMETRE      0.00

 HC   GRAMS/KG OF FUEL   49.64      HC   GRAMS/MIN     9.79
 CO   GRAMS/KG OF FUEL   250.4      CO   GRAMS/MIN    10.7
 CO2  GRAMS/KG OF FUEL    2048      CO2  GRAMS/MIN      87
 NOX  GRAMS/KG OF FUEL    1.32      NOX  GRAMS/MIN      .06
 SO2  GRAMS/KG OF FUEL    0.00      SO2  GRAMS/MIN     0.00
 CARBON BALANCE FUEL ECONOMY                  22.25  KILOMETRES/LITRE
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                    TABLE                 VEHICLE EMISSION RESULTS
                                      1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  700        TEST NO. 2        DATE 10/19/76                    MFGR. CODE    -0                 YR.  1976
VEHICLE MODEL  SUZUKI GT750            ENGINE     .75 LITRE 3           CURB WT.      0 KG              GVW      0 KG

BAROMETER 743.71 MM OF HG.                                              WET BULB TEMP  17.2 DEG. C
DRY BULB TEMP.   25.0 DEG. C                                            ABS. HUMIDITY   9.2 GRAMS/KG
REL. HUMIDITY     96 PCT.                                               DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                        BLOWER INLET PRESS., G1 957.2 MM, H2O
     BLOWER DIF. PRESS., G2, 977.5 MM, H2O                              BLOWER INLET TEMP.   43 DEG. C
     BAG RESULTS
     BAG NO.                                  1               2              3
     BLOWER REVOLUTIONS                    6276           10756           6274
     ROLL COUNTS                            3466            3710           3462
     HC   SAMPLE  METER READING/SCALE      34.5/4          21.5/4         27.5/4
     HC   SAMPLE  PPM                      3450            2150           2750
     HC   BACKGRD METER READING/SCALE       4.2/3           3.2/3          3.2/3
     HC   BACKGRD PPM                        42              32             32
     CO   SAMPLE  METER READING/SCALE      59.3/3          39.3/3         44.6/3
     CO   SAMPLE  PPM                      1493             945           1085
     CO   BACKGRD METER READING/SCALE        .2/3            .2/3           .1/3
     CO   BACKGRD PPM                         4               4              2
     CO2  SAMPLE  METER READING/SCALE      37.9/3          24.7/3         34.8/3
     CO2  SAMPLE  PERCENT                   .64             .40            .58
     CO2  BACKGRD METER READING/SCALE       5.8/3           5.5/3          5.1/3
     CO2  BACKGRD PERCENT                   .09             .08            .08
     NOX  SAMPLE  METER READING/SCALE       3.9/2           1.3/2          4.1/2
     NOX  SAMPLE  PPM                       3.9             1.3            4.1
     NOX  BACKGRD METER READING/SCALE        .7/2            .6/2           .6/2
     NOX  BACKGRD PPM                        .7              .6             .6
     SO2  SAMPLE  METER READING/SCALE     -0.0/*          -0.0/*         -0.0/*
     SO2  SAMPLE  PPM                       0.0             0.0            0.0
     SO2  BACKGRD METER READING/SCALE     -0.0/*          -0.0/*         -0.0/*
     SO2  BACKGRD PPM                       0.0             0.0            0.0

     HC   CONCENTRATION PPM                3412            2120           2720
     CO   CONCENTRATION PPM                1499             920           1055
     CO2  CONCENTRATION PCT                 .56             .32            .51
     NOX  CONCENTRATION PPM                 3.3              .7            3.5
     SO2  CONCENTRATION PPM                 0.0             0.0            0.0
     HC   MASS GRAMS                       86.65           92.26          69.06
     CO   MASS GRAMS                       79.30           80.81          54.05
     CO2  MASS GRAMS                      450.99          447.00         412.20
     NOX  MASS GRAMS                        .26             .10            .28
     SO2  MASS GRAMS                       0.00            0.00           0.00
     TOTAL CARBON GRAMS                   229.94          236.51         195.96

     WEIGHTED MASS HC      19.16 GRAMS/KILOMETRE
     WEIGHTED MASS CO      12.04 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     73.45 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .03 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       11.93 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  17.1  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST             661.91 GRAMS
     ESTIMATED FUEL WEIGHT =   .76KG.
     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 700

DATE 10/19/76              TIME     -0 HRS.          TEST NO.  2
MODEL  1976 SUZUKI GT750   HIWAY CYCLE               ENGINE  .8 LITRE  3
DRIVER   TJ                TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  17 C        DRY BULB TEMP  25 C       REL. HUM.  45.6 PCT
SPEC. HUM.    9.2 GRAM/KG  BARO.  743.7 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.   457.2  MM. H2O
  BLOWER DIF.  PRESS.   477.5  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9903
  DISTANCE TRAVELED    16.46  KILOMETRES
  BLOWER REVOLUTIONS      9492
  BLOWER CU. CM /REV.   8109

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE               37.0/4
   HC   SAMPLE  PPM                               3700
   HC   BACKGRD METER READING/SCALE                4.2/3
   HC   BACKGRD PPM                                 42
   CO   SAMPLE  METER READING/SCALE               78.8/3
   CO   SAMPLE  PPM                               2122
   CO   BACKGRD METER READING/SCALE                1.0/3
   CO   BACKGRD PPM                                 22
   CO2  SAMPLE  METER READING/SCALE               53.8/3
   CO2  SAMPLE  PERCENT                             .94
   CO2  BACKGRD METER READING/SCALE                3.6/3
   CO2  BACKGRD PERCENT                             .06
   NOX  SAMPLE  METER READING/SCALE                5.2/2
   NOX  SAMPLE  PPM                                5.2
   NOX  BACKGRD METER READING/SCALE                 .9/2
   NOX  BACKGRD PPM                                 .9
   HC   CONCENTRATION PPM                         3663
   CO   CONCENTRATION PPM                         2034
   CO2  CONCENTRATION PCT                           .89
   NOX  CONCENTRATION PPM                          4.4
   SO2  COCENTRATION PPM                           0.0
   HC   MASS (GRAMS)                            140.71
   CO   MASS (GRAMS)                            157.75
   CO2  MASS (GRAMS)                           1092.51
   NOX  MASS (GRAMS)                                .53
   SO2  MASS (GRAMS)                              0.00

 HC   GRAMS/KILOMETRE       8.55
 CO   GRAMS/KILOMETRE       9.58
 CO2  GRAMS/KILOMETRE      66.37
 NOX  GRAMS/KILOMETRE        .03
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  49.65     HC   GRAMS/MIN  11.02
 CO   GRAMS/KG OF FUEL  279.9     CO   GRAMS/MIN   12.4
 CO2  GRAMS/KG OF FUEL   1938     CO2  GRAMS/MIN     86
 NOX  GRAMS/KG OF FUEL    .95     NOX  GRAMS/MIN    .04
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                     21.46  KILOMETRES/LITRE
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              TABLE                                      VEHICLE EMISSION RESULTS
                                                 1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  700      TEST NO. 1         DATE  2/ 9/77                              MFGR. CODE   -0                      YR.  1976
VEHICLE MODEL  GT750  1ST STEP, CDI+LEAN  ENGINE      .75 LITRE 3                CURB WT.      0 KG                   GVW      0 KG

BAROMETER 747.27 MM OF HG.
DRY BULB TEMP.    23.9 DEG. C                                                    WET BULB TEMP  12.8 DEG. C
REL. HUMIDITY     25 PCT.                                                        ABS. HUMIDITY   4.6 GRAMS/KG
                                                                                 DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 482.6 MM. H2O                                        BLOWER INLET PRESS., G1 457.2 MM. H2O
    BAG RESULTS                                                                  BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                        1                2                 3
    BLOWER REVOLUTIONS                          6258            10692              6268
    ROLL COUNTS                                  3493             3837              3493
    HC   SAMPLE  METER READING/SCALE            23.9/4           21.2/4            22.9/4
    HC   SAMPLE  PPM                            2390             2120              2240
    HC   BACKGRD METER READING/SCALE             2.8/3            2.5/3             2.2/3
    HC   BACKGRD PPM                              28               25                22
    CO   SAMPLE  METER READING/SCALE            83.1/*           95.0/*            89.2/*
    CO   SAMPLE  PPM                             386              488               436
    CO   BACKGRD METER HEADING/SCALE              .5/*             .5/*              .5/*
    CO   BACKGRD PPM                               1                1                 1
    CO2  SAMPLE  METER READING/SCALE            39.0/3           23.5/3            34.2/3
    CO2  SAMPLE  PERCENT                         .66              .38               .57
    CO2  BACKGRD METER READING/SCALE             3.1/3            3.1/3             2.9/3
    CO2  BACKGRD PERCENT                         .05              .05               .04
    NOX  SAMPLE  METER READING/SCALE             5.7/2            1.6/2             6.0/2
    NOX  SAMPLE  PPM                             5.7              1.6               6.0
    NOX  BACKGRD METER READING/SCALE              .6/2             .5/2              .5/2
    NOX  BACKGRD PPM                              .6               .5                .5
    SO2  SAMPLE  METER READING/SCALE            -0.0/*           -0.0/*            -0.0/*
    SO2  SAMPLE  PPM                             0.0              0.0               0.0
    SO2  BACKGRD METER READING/SCALE            -0.0/*           -0.0/*            -0.0/*
    SO2  BACKGRD PPM                             0.0              0.0               0.0

    HC   CONCENTRATION PPM                      2364             2096              2219
    CO   CONCENTRATION PPM                       377              479               426
    CO2  CONCENTRATION PCT                       .62              .34               .53
    NOX  CONCENTRATION PPM                       5.1              1.1               5.5
    SO2  CONCENTRATION PPM                       0.0              0.0               0.0
    HC   MASS GRAMS                            60.13            91.08             56.54
    CO   MASS GRAMS                            19.36            42.06             21.91
    CO2  MASS GRAMS                           498.80           466.06            430.19
    NOX  MASS GRAMS                              .36              .13               .39
    SO2  MASS GRAMS                             0.00             0.00              0.00
    TOTAL CARBON GRAMS                        196.48           224.07            175.74

    WEIGHTED MASS HC      12.24 GRAMS/KILOMETRE
    WEIGHTED MASS CO       5.16 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     75.98 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .04 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.19 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  19.1  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              596.29 GRAMS
    ESTIMATED FUEL WEIGHT =    .69KG.
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     TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 700

DATE  2/ 9/77             TIME     -0 HRS.            TEST NO.  1
MODEL  1976 SUZUKI GT 750  FET  1ST STEP, CDI+LEAN  ENGINE  .8 LITRE  3
DRIVER   KN               TEST WT.     0 KG.       GVW     0 KG
WET BULB TEMP  14 C       DRY BULB TEMP  26 C      REL. HUM.  24.6 PCT
SPEC. HUM.   5.1 GRAM/KG  BARO.  747.5 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION           12.75 MINUTES
  BLOWER INLET PRESS.   967.9  MM. H2O
  BLOWER DIF.  PRESS.   995.3  MM  H2O
  BLOWER INLET TEMP.       93  DEG. C
  DYNO REVOLUTIONS      10090
  DISTANCE TRAVELED     16.69  KILOMETRES
  BLOWER REVOLUTIONS       9976
  BLOWER CU. CM /REV.   8082

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                    17.5/9
   HC   SAMPLE  PPM                                    1750
   HC   BACKGRD METER READING/SCALE                     2.0/3
   HC   BACKGRD PPM                                      20
   CO   SAMPLE  METER READING/SCALE                    69.5/*
   CO   SAMPLE  PPM                                     265
   CO   BACKGRD METER READING/SCALE                      .5/*
   CO   BACKGRD PPM                                       1
   CO2  SAMPLE  METER READING/SCALE                    53.2/3
   CO2  SAMPLE  PERCENT                                 .93
   CO2  BACKGRD METER READING/SCALE                     2.9/3
   CO2  BACKGRD PERCENT                                 .04
   NOX  SAMPLE  METER READING/SCALE                    11.8/2
   NOX  SAMPLE  PPM                                    11.8
   NOX  BACKGRD METER READING/SCALE                     .6/2
   NOX  BACKGRD PPM                                      .6
   HC   CONCENTRATION PPM                              1732
   CO   CONCENTRATION PPM                               256
   CO2  CONCENTRATION PCT                               .89
   NOX  CONCENTRATION PPM                              11.3
   SO2  COCENTRATION PPM                                0.0
   HC   MASS (GRAMS)                                  66.47
   CO   MASS (GRAMS)                                  19.87
   CO2  MASS (GRAMS)                                1087.56
   NOX  MASS (GRAMS)                                   1.21
   SO2  MASS (GRAMS)                                   0.00

  HC   GRAMS/KILOMETRE      3.98
  CO   GRAMS/KILOMETRE      1.19
  CO2  GRAMS/KILOMETRE     65.17
  NOX  GRAMS/KILOMETRE       .07
  SO2  GRAMS/KILOMETRE      0.00

  HC   GRAMS/KG OF FUEL  *8.97     HC   GRAMS/MIN    5.21
  CO   GRAMS/KG OF FUEL  47.4      CO   GRAMS/MIN    1.6
  CO2  GRAMS/KG OF FUEL  2593      CO2  GRAMS/MIN     85
  NOX  GRAMS/KG OF FUEL  2.88      NOX  GRAMS/MIN    .09
  SO2  GRAMS/KG OF FUEL  0.00      SO2  GRAMS/MIN   0.00
  CARBON BALANCE FUEL ECONOMY                       29.23  KILOMETRES/LITRE
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                 TABLE                    VEHICLE EMISSION RESULTS
                                     1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  700       TEST NO. 2        DATE  2/14/77                       MFGR. CODE   -0                  YR.  1976
VEHICLE MODEL  G7750 1ST STEP, CDI+LEAN   ENGINE     .75 LITRE 3          CURB WT.      0 KG               GVW     0 KG

BAROMETER 741.93 MM OF HG.                                                WET BULB TEMP  15.0 DEG. C
DRY BULB TEMP.    25.0 DEG. C                                             ABS. HUMIDITY   6.6 GRAMS/KG
REL. HUMIDITY      33 PCT.                                                DYNO ROLL CONSTANT   467.97

EXHAUST EMISSIONS
                                                                          BLOWER INLET PRESS., G1 355.6 MM. H2O
   BLOWER DIF. PRESS., G2, 482.6 MM. H2O                                  BLOWER INLET TEMP.    43 DEG. C
   BAG RESULTS
   BAG NO.                                     1              2              3
   BLOWER REVOLUTIONS                       6274          10745           6301
   ROLL COUNTS                               3535           3829           3552
   HC   SAMPLE  METER READING/SCALE         22.0/4         24.9/4         22.3/4
   HC   SAMPLE  PPM                         2200           2490           2230
   HC   BACKGRD METER READING/SCALE          5.2/3          5.2/3          5.0/3
   HC   BACKGRD PPM                           52             52             50
   CO   SAMPLE  METER READING/SCALE         82.5/*         24.2/3         86.9/*
   CO   SAMPLE  PPM                         382            562            416
   CO   BACKGRD METER READING/SCALE          1.0/*          1.0/*           .3/3
   CO   BACKGRD PPM                            3              3              6
   CO2  SAMPLE  METER READING/SCALE         41.4/3         25.1/3         36.2/3
   CO2  SAMPLE  PERCENT                      .70            .41            .61
   CO2  BACKGRD METER READING/SCALE           .9/2          5.1/3          5.4/3
   CO2  BACKGRD PERCENT                      .03            .08            .08
   NOX  SAMPLE  METER READING/SCALE          8.8/2          2.1/2          9.2/2
   NOX  SAMPLE  PPM                          8.8            2.1            9.2
   NOX  BACKGRD METER READING/SCALE          3.8/3           .4/2           .4/2
   NOX  BACKGRD PPM                         11.4             .4             .4
   SO2  SAMPLE  METER READING/SCALE         -0.0/*         -0.0/*         -0.0/*
   SO2  SAMPLE  PPM                          0.0            0.0            0.0
   SO2  BACKGRD METER READING/SCALE         -0.0/*         -0.0/*         -0.0/*
   SO2  BACKGRD PPM                          0.0            0.0            0.0

   HC   CONCENTRATION PPM                   2152           2441           2183
   CO   CONCENTRATION PPM                    370            549            401
   CO2  CONCENTRATION PCT                    .67            .33            .53
   NOX  CONCENTRATION PPM                   -1.8            1.7            8.8
   SO2  CONCENTRATION PPM                    0.0            0.0            0.0
   HC   MASS GRAMS                         55.04         106.93          56.10
   CO   MASS GRAMS                         19.11          48.54          20.81
   CO2  MASS GRAMS                        549.53         467.95         434.07
   NOX  MASS GRAMS                          -.13            .22            .66
   SO2  MASS GRAMS                          0.00           0.00           0.00
   TOTAL CARBON GRAMS                     205.82         241.09         175.45

   WEIGHTED MASS HC      13.26 GRAMS/KILOMETRE
   WEIGHTED MASS CO       5.60 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     77.64 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .04 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE       12.26 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  18.3  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST             622.85 GRAMS
   ESTIMATED FUEL WEIGHT =   .72KG.
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         TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 200

DATE  2/14/77               TIME     -0 HRS.            TEST NO.  2
MODEL  1976 SUZUKI GT-750   FET  1ST STEP, CDI+LEAN   ENGINE  .8 LITRE  3
DRIVER   KN                 TEST WT.      0 KG.       GVW     0 KG
WET BULB TEMP  16 C         DRY BULB TEMP  26 C       REL. HUM.  34.5 PCT
SPEC. HUM.    7.4 GRAM/KG   BARO.  741.9 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION            12.74 MINUTES
  BLOWER INLET PRESS.   457.2  MM. H20
  BLOWER DIF.  PRESS.   482.6  MM  H20
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS      10013
  DISTANCE TRAVELED     16.64  KILOMETRES
  BLOWER REVOLUTIONS      9470
  BLOWER CU. CM /REV.   8097

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              21.3/4
   HC   SAMPLE  PPM                              2130
   HC   BACKGRD METER READING/SCALE               3.6/3
   HC   BACKGRD PPM                                36
   CO   SAMPLE  METER READING/SCALE              58.6/*
   CO   SAMPLE  PPM                               232
   CO   BACKGRD METER READING/SCALE                .6/*
   CO   BACKGRD PPM                                 2
   CO2  SAMPLE  METER READING/SCALE              61.5/3
   CO2  SAMPLE  PERCENT                          1.09
   CO2  BACKGRD METER READING/SCALE               4.6/3
   CO2  BACKGRD PERCENT                           .07
   NOX  SAMPLE  METER READING/SCALE              17.7/2
   NOX  SAMPLE  PPM                              17.7
   NOX  BACKGRD METER READING/SCALE               1.0/2
   NOX  BACKGRD PPM                               1.0
   HC   CONCENTRATION PPM                        2098
   CO   CONCENTRATION PPM                         223
   CO2  CONCENTRATION PCT                        1.03
   NOX  CONCENTRATION PPM                        16.8
   SO2  COCENTRATION PPM                         0.0
   HC   MASS (GRAMS)                            80.08
   CO   MASS (GRAMS)                            17.20
   CO2  MASS (GRAMS)                          1252.70
   NOX  MASS (GRAMS)                             1.92
   SO2  MASS (GRAMS)                             0.00

 HC   GRAMS/KILOMETRE       4.81
 CO   GRAMS/KILOMETRE       1.03
 CO2  GRAMS/KILOMETRE      75.26
 NOX  GRAMS/KILOMETRE        .12
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  45.50      HC   GRAMS/MIN    6.28
 CO   GRAMS/KG OF FUEL   35.5      CO   GRAMS/MIN    1.3
 CO2  GRAMS/KG OF FUEL   2589      CO2  GRAMS/MIN     98
 NOX  GRAMS/KG OF FUEL   3.96      NOX  GRAMS/MIN    .15
 SO2  GRAMS/KG OF FUEL   0.00      SO2  GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY
                                               25.27  KILOMETRES/LITRE
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                    TABLE                        VEHICLE EMISSION RESULTS
                                            1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  700        TEST NO. 1        DATE  7/21/77                     MFGR. CODE   -0                YR.  1976
VEHICLE MODEL   GT750 LN+CAT +CDI      ENGINE     .75 LITRE 3            CURB WT.      0 KG             GVW      0 KG

BAROMETER 743.46 MM OF HG.
DRY BULB TEMP.    27.8 DEG. C                                       WET BULB TEMP  20.0 DEG. C
REL. HUMIDITY     49 PCT.                                           ABS. HUMIDITY  11.6 GRAMS/KG
                                                                    DYNO ROLL CONSTANT    467.47
EXHAUST EMISSIONS

                                                                    BLOWER INLET PRESS., G1 462.3 MM. H2O
    BLOWER DIF. PRESS., G2, 490.2 MM. H2O                           BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                       1               2               3
    BLOWER REVOLUTIONS                          6265           10725            6261
    ROLL COUNTS                                 3448            3754            3467
    HC    SAMPLE  METER READING/SCALE           12.7/4          13.2/3          23.7/3
    HC    SAMPLE  PPM                           1270             132             237
    HC    BACKGRD METER READING/SCALE             .1/4            .1/4           1.5/3
    HC    BACKGRD PPM                             10              10              15
    CO    SAMPLE  METER READING/SCALE           26.0/3          83.8/*          62.2/*
    CO    SAMPLE  PPM                            606             345             252
    CO    BACKGRD METER READING/SCALE             .2/3            .1/3            .5/*
    CO    BACKGRD PPM                              4               2               2
    CO2   SAMPLE  METER READING/SCALE           48.9/3          35.4/3          47.5/3
    CO2   SAMPLE  PERCENT                        .85             .59             .82
    CO2   BACKGRD METER READING/SCALE            3.8/3           3.9/3           4.4/3
    CO2   BACKGRD PERCENT                        .06             .06             .07
    NOX   SAMPLE  METER READING/SCALE            7.1/2           1.3/2           6.5/2
    NOX   SAMPLE  PPM                            7.1             1.3             6.5
    NOX   BACKGRD METER READING/SCALE             .9/2            .8/2            .8/2
    NOX   BACKGRD PPM                             .9              .8              .8
    SO2   SAMPLE  METER READING/SCALE          -0.0/*          -0.0/*          -0.0/*
    SO2   SAMPLE  PPM                            0.0             0.0             0.0
    SO2   BACKGRD METER READING/SCALE          -0.0/*          -0.0/*          -0.0/*
    SO2   BACKGRD PPM                            0.0             0.0             0.0

    HC    CONCENTRATION PPM                     1261             122             223
    CO    CONCENTRATION PPM                      583             382             243
    CO2   CONCENTRATION PCT                      .79             .54             .76
    NOX   CONCENTRATION PPM                      6.3              .5             5.8
    SO2   CONCENTRATION PPM                      0.0             0.0             0.0
    HC    MASS GRAMS                           31.84            5.29            5.63
    CO    MASS GRAMS                           29.73           33.32           12.38
    CO2   MASS GRAMS                          637.96          738.83          608.39
    NOX   MASS GRAMS                             .54             .08             .50
    SO2   MASS GRAMS                            0.00            0.00            0.00
    TOTAL CARBON GRAMS                        219.42          220.52          176.22

    WEIGHTED MASS HC        1.85 GRAMS/KILOMETRE
    WEIGHTED MASS CO        4.43 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     113.43 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        .05 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.99 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  18.6  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST             611.16 GRAMS
    ESTIMATED FUEL WEIGHT =    .71KG.
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      TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 700

DATE  7/21/77                  TIME     -0 HRS.          TEST NO.  1
MODEL  1976 SUZUKI GT-750 FET LEAN+CAT+CDI               ENGINE  .8 LITRE  3
DRIVER   KN                    TEST WT.       0 KG.      GVW     0 KG
WET BULB TEMP  20 C            DRY BULB TEMP  29 C       REL. HUM.  41.5 PCT
SPEC. HUM.  10.9 GRAM/KG       BARO.  742.2 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS.  457.2  MM. H20
  BLOWER DIF.  PRESS.  482.6  MM  H20
  BLOWER INLET TEMP.     43  DEG. C
  DYNO REVOLUTIONS     9846
  DISTANCE TRAVELED   16.37  KILOMETRES
  BLOWER REVOLUTIONS  .  9349
  BLOWER CU. CM /REV.  8075

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              38.0/3
   HC   SAMPLE  PPM                               380
   HC   BACKGRD METER READING/SCALE               1.5/3
   HC   BACKGRD PPM                                15
   CO   SAMPLE  METER READING/SCALE              59.3/*
   CO   SAMPLE  PPM                               132
   CO   BACKGRD METER READING/SCALE                .2/*
   CO   BACKGRD PPM                                 0
   CO2  SAMPLE  METER READING/SCALE              75.2/3
   CO2  SAMPLE  PERCENT                          1.37
   CO2  BACKGRD METER READING/SCALE               3.8/3
   CO2  BACKGRD PERCENT                           .06
   NOX  SAMPLE  METER READING/SCALE              16.5/2
   NOX  SAMPLE  PPM                              16.5
   NOX  BACKGRD METER READING/SCALE               .6/2
   NOX  BACKGRD PPM                               .6
   HC   CONCENTRATION PPM                        367
   CO   CONCENTRATION PPM                        127
   CO2  CONCENTRATION PCT                        1.32
   NOX  CONCENTRATION PPM                        16.0
   SO2  COCENTRATION PPM                         0.0
   HC   MASS (GRAMS)                            13.78
   CO   MASS (GRAMS)                             9.62
   CO2  MASS (GRAMS)                          1580.69
   NOX  MASS (GRAMS)                             2.00
   SO2  MASS (GRAMS)                             0.00

 HC   GRAMS/KILOMETRE        .84
 CO   GRAMS/KILOMETRE        .59
 CO2  GRAMS/KILOMETRE      96.58
 NOX  GRAMS/KILOMETRE        .12
 SO2  GRAMS/KILOMETRE       0.00

 HC   GRAMS/KG OF FUEL  26.64      HC   GRAMS/MIN   1.08
 CO   GRAMS/KG OF FUEL  18.6       CO   GRAMS/MIN    .8
 CO2  GRAMS/KG OF FUEL  3054       CO2  GRAMS/MIN   124
 NOX  GRAMS/KG OF FUEL  3.87       NOX  GRAMS/MIN    .16
 SO2  GRAMS/KG OF FUEL  0.00       SO2  GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                       23.24  KILOMETRES/LITRE
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               TABLE                         VEHICLE EMISSION RESULTS
                                       1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  700        TEST NO. 1          DATE  7/28/77                    MFGR. CODE     -0                   YR.   1976
VEHICLE MODEL   GT750 LN+CAT+AIR+CDI     ENGINE     .75 LITRE 3           CURB WT.        0 KG                GVW       U KG

BAROMETER 741.68 MM OF HG.                                            WET BULB TEMP   21.7 DEG. C
DRY BULB TEMP.     30.0 DEG. C                                        ABS. HUMIDITY   13.0 GRAMS/KG
REL. HUMIDITY      48 PCT.                                            DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                      BLOWER INLET PRESS., G1 457.2 MM. H2O
    BLOWER DIF. PRESS., G2, 482.6 MM. H2O                             BLOWER INLET TEMP.     43 DEG. C
    BAG RESULTS
    BAG NO.                                        1               2               3
    BLOWER REVOLUTIONS                          6267           10727            6267
    ROLL COUNTS                                  3489            3784            3487
    HC   SAMPLE  METER READING/SCALE            11.7/4          86.8/2          14.3/3
    HC   SAMPLE  PPM                            1170              87             143
    HC   BACKGRD METER READING/SCALE             1.3/3           1.2/3           1.3/3
    HC   BACKGRD PPM                              13              12              13
    CO   SAMPLE  METER READING/SCALE            67.6/*          27.8/*          22.1/*
    CO   SAMPLE  PPM                             152              58              45
    CO   BACKGRD METER READING/SCALE              .2/*            .3/*            .5/*
    CO   BACKGRD PPM                               0               1               1
    CO2  SAMPLE  METER READING/SCALE            48.4/3          37.2/3          43.1/3
    CO2  SAMPLE  PERCENT                         .84             .63             .74
    CO2  BACKGRD METER READING/SCALE             4.5/3           4.7/3           5.4/3
    CO2  BACKGRD PERCENT                         .07             .07             .08
    NOX  SAMPLE  METER READING/SCALE             6.6/2           1.7/2           4.9/2
    NOX  SAMPLE  PPM                             6.6             1.7             4.9
    NOX  BACKGRD METER READING/SCALE              .7/2            .7/2            .7/2
    NOX  BACKGRD PPM                              .7              .7              .7
    SO2  SAMPLE  METER READING/SCALE            -0.0/*          -0.0/*          -0.0/*
    SO2  SAMPLE  PPM                             0.0             0.0             0.0
    SO2  BACKGRD METER READING/SCALE            -0.0/*          -0.0/*          -0.0/*
    SO2  BACKGRD PPM                             0.0             0.0             0.0

    HC   CONCENTRATION PPM                      1158              75             131
    CO   CONCENTRATION PPM                       147              56              43
    CO2  CONCENTRATION PCT                       .77             .56             .66
    NOX  CONCENTRATION PPM                       6.0             1.0             4.2
    SO2  CONCENTRATION PPM                       0.0             0.0             0.0
    HC   MASS GRAMS                            29.24            3.26            3.30
    CO   MASS GRAMS                             7.51            4.86            2.17
    CO2  MASS GRAMS                           621.74          767.41          529.10
    NOX  MASS GRAMS                              .54             .16             .38
    SO2  MASS GRAMS                             0.00            0.00            0.00
    TOTAL CARBON GRAMS                        198.21          214.34          148.19

    WEIGHTED MASS HC       1.47 GRAMS/KILOMETRE
    WEIGHTED MASS CO        .77 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    110.55 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .05 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.09 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  20.1  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              560.74 GRAMS
    ESTIMATED FUEL WEIGHT =    .65KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBFR 700

DATE  7/28/77               TIME     -0 HRS.        TEST NO.  1
MODEL  1976 SUZUKI GT-750 FET LN+CAT+ATR+CDI        ENGINE  .8 LITRE  3
DRIVER   KN                 TEST WT.      0 KG.     GVW    0 KG
WET BULB TEMP  19 C         DRY BULB TEMP  28 C     REL. HUM.  42.5 PCT
SPEC. HUM.  10.1 GRAM/KG    BARO.  743.2 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION          12.77 MINUTES
  BLOWER INLET PRESS.  457.2  MM. H2O
  BLOWER DIF.  PRESS.  482.6  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     9857
  DISTANCE TRAVELED   16.38  KILOMETRES
  BLOWER REVOLUTIONS     9485
  BLOWER CU. CM /REV.  8098

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE              26.4/3
   HC  SAMPLE  PPM                              264
   HC  BACKGRD METER READING/SCALE               .9/3
   HC  BACKGRD PPM                                9
   CO  SAMPLE  METER READING/SCALE              46.0/*
   CO  SAMPLE  PPM                               43
   CO  BACKGRD METER READING/SCALE               .4/*
   CO  BACKGRD PPM                                0
   CO2 SAMPLE  METER READING/SCALE              70.3/3
   CO2 SAMPLE  PERCENT                          1.27
   CO2 BACKGRD METER READING/SCALE               3.4/3
   CO2 BACKGRD PERCENT                           .05
   NOX SAMPLE  METER READING/SCALE              10.6/2
   NOX SAMPLE  PPM                              10.6
   NOX BACKGRD METER READING/SCALE               .9/2
   NOX BACKGRD PPM                               .9
   HC  CONCENTRATION PPM                        256
   CO  CONCENTRATION PPM                         41
   CO2. CONCENTRATION PCT                       1.22
   NOX CONCENTRATION PPM                        9.8
   SO2 COCENTRATION PPM                         0.0
   HC  MASS (GRAMS)                             9.80
   CO  MASS (GRAMS)                             3.18
   CO2 MASS (GRAMS)                          1494.19
   NOX MASS (GRAMS)                             1.22
   SO2 MASS (GRAMS)                             0.00

HC  GRAMS/KILOMETRE       .60
CO  GRAMS/KILOMETRE       .19
CO2 GRAMS/KILOMETRE     91.19
NOX GRAMS/KILOMETRE       .07
SO2 GRAMS/KILOMETRE      0.00

HC  GRAMS/KG OF FUEL  20.30     HC  GRAMS/MIN     .77
CO  GRAMS/KG OF FUEL    6.6     CO  GRAMS/MIN      .2
CO2 GRAMS/KG OF FUEL   3095     CO2 GRAMS/MIN     117
NOX GRAMS/KG OF FUEL   2.53     NOX GRAMS/MIN     .10
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                   24.93  KILOMETRES/LITRE
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                    TABLE                    VEHICLE EMISSION RESULTS
                                        1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  700         TEST NO. 2          DATE  7/29/77                    MFGR. CODE   -0                    YR.  1976
VEHICLE MODEL  GT750 LN+CAT+AIR+CDI       ENGINE     .75 LITRE 3           CURB WT.     0 KG                  GVW     0 KG

BAROMETER 743.20 MM OF HG.                                                 WET BULB TEMP  20.0 DEG. C
DRY BULB TEMP.    25.6 DEG. C                                              ABS. HUMIDITY  12.6 GRAMS/KG
REL. HUMIDITY      60 PCT.                                                 DYNO ROLL CONSTANT    467.97

EXHAUST EMISSIONS
                                                                           BLOWER INLET PRESS., G1 457.2 MM. H2O
    BLOWER DIF. PRESS., G2, 495.3 MM. H2O                                  BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                       1              2              3
    BLOWER REVOLUTIONS                         6259          10750           6260
    ROLL COUNTS                                 3460           3747           3483
    HC   SAMPLE  METER READING/SCALE          10.1/4         86.3/2         17.5/3
    HC   SAMPLE  PPM                          1010             86            175
    HC   BACKGRD METER READING/SCALE            .1/4           .1/4         14.2/2
    HC   BACKGRD PPM                            10             10             14
    CO   SAMPLE  METER READING/SCALE          81.4/*         48.2/*         38.8/*
    CO   SAMPLE  PPM                           189             46             36
    CO   BACKGRD METER READING/SCALE            .8/*          1.0/*           .6/*
    CO   BACKGRD PPM                             1              2              1
    CO2  SAMPLE  METER READING/SCALE          44.8/3         33.2/3         44.4/3
    CO2  SAMPLE  PERCENT                        .77            .55            .76
    CO2  BACKGRD METER READING/SCALE           2.8/3          2.8/3          1.8/3
    CO2  BACKGRD PERCENT                        .04            .04            .03
    NOX  SAMPLE  METER READING/SCALE           6.4/2          1.9/2          6.5/2
    NOX  SAMPLE  PPM                           6.4            1.9            6.5
    NOX  BACKGRD METER READING/SCALE            .9/2           .8/2           .9/2
    NOX  BACKGRD PPM                            .9             .8             .9
    SO2  SAMPLE  METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                           0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                           0.0            0.0            0.0

    HC   CONCENTRATION PPM                    1001             77            162
    CO   CONCENTRATION PPM                     181             43             34
    CO2  CONCENTRATION PCT                     .73            .51            .73
    NOX  CONCENTRATION PPM                     5.6            1.1            5.7
    SO2  CONCENTRATION PPM                     0.0            0.0            0.0
    HC   MASS GRAMS                          25.23           3.32           4.08
    CO   MASS GRAMS                           9.22           3.72           1.73
    CO2  MASS GRAMS                         585.01         706.98         590.47
    NOX  MASS GRAMS                           .50            .17            .50
    SO2  MASS GRAMS                          0.00           0.00           0.00
    TOTAL CARBON GRAMS                      185.45         197.42         165.42

    WEIGHTED MASS HC        1.37 GRAMS/KILOMETRE
    WEIGHTED MASS CO         .72 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     107.91 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        .06 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.00 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  20.7  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              548.29 GRAMS
    ESTIMATED FUEL WEIGHT =    .63KG.
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     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 700

DATE  7/29/77               TIME     -0 HRS.        TEST NO.  2
MODEL  1976 SUZUKI GT-750 FET LN+CAT+AIR+CDI        ENGINE  .8 LITRE  3
DRIVER   KN                 TEST WT.      0 KG.     GVW    0 KG
WET BULB TEMP  20 C         DRY BULB TEMP  27 C     REL. HUM.  54.1 PCT
SPEC. HUM.  12.1 GRAM/KG    BARO.  743.2 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION           12.77 MINUTES
  BLOWER INLET PRESS.  457.2  MM. H2O
  BLOWER DIF.  PRESS.  482.6  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9870
  DISTANCE TRAVELED   16.41  KILOMETRES
  BLOWER REVOLUTIONS      9480
  BLOWER CU. CM /REV.  8097

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE             23.6/3
   HC   SAMPLE  PPM                              236
   HC   BACKGRD METER READING/SCALE              1.1/3
   HC   BACKGRD PPM                               11
   CO   SAMPLE  METER READING/SCALE             40.7/*
   CO   SAMPLE  PPM                               38
   CO   BACKGRD METER READING/SCALE               .5/*
   CO   BACKGRD PPM                                1
   CO2  SAMPLE  METER READING/SCALE             71.2/3
   CO2  SAMPLE  PERCENT                         1.29
   CO2  BACKGRD METER READING/SCALE              3.8/3
   CO2  BACKGRD PERCENT                          .06
   NOX  SAMPLE  METER READING/SCALE             12.7/2
   NOX  SAMPLE  PPM                             12.7
   NOX  BACKGRD METER READING/SCALE              1.0/2
   NOX  BACKGRD PPM                              1.0
   HC   CONCENTRATION PPM                        226
   CO   CONCENTRATION PPM                         36
   CO2  CONCENTRATION PCT                       1.24
   NOX  CONCENTRATION PPM                       11.8
   SO2  COCENTRATION PPM                         0.0
   HC   MASS (GRAMS)                            8.66
   CO   MASS (GRAMS)                            2.75
   CO2  MASS (GRAMS)                         1509.01
   NOX  MASS (GRAMS)                            1.57
   SO2  MASS (GRAMS)                            0.00

HC   GRAMS/KILOMETRE        .53
CO   GRAMS/KILOMETRE        .17
CO2  GRAMS/KILOMFTRE      91.98
NOX  GRAMS/KILOMETRE        .10
SO2  GRAMS/KILOMETRE       0.00

HC   GRAMS/KG OF FUEL  17.80     HC   GRAMS/MIN     .68
CO   GRAMS/KG OF FUEL    5.7     CO   GRAMS/MIN      .2
CO2  GRAMS/KG OF FUEL   3104     CO2  GRAMS/MIN     118
NOX  GRAMS/KG OF FUEL   3.23     NOX  GRAMS/MIN     .12
SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                      24.79  KILOMETRES/LITRE
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APPENDIX E

RESULTS FROM FTP, FET, AND STEADY-STATE TESTS WITH MALADJUSTMENT

Motorcycle	Page
Suzuki TS-100	E-2 to E-9
Yamaha RD-400	E-10 to E-17
Honda XL-125	E-18 to E-25
Kawasaki KZ-900	E-26 to E-35

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki TS 100

Date 10/20/76 Sequence Baseline

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1920	0	5.00	5.07	7.5	2.2	144,000
20	2nd	----	.43	6.66	8.84	2.0	2.9	33,000
30	4th	----	.93	4.85	9.39	3.6	2.7	40,700
40	5th	----	1.78	5.96	7.91	4.4	3.0	62,000
50	5th	----	2.85	7.42	7.74	3.9	3.5	59,000
0	N	1980	0	5.43	4.91	7.2	3.0	150,000

Notes: Head temp. reached approx. 240°C during 40 mph steady state

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki TS 100

Date 10/20/76 Sequence Lean Adjustment

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1900	0	3.67	6.33	7.0	7.8	122,000
20	2nd	----	.40	2.19	11.79	2.9	20.	23,000
30	4th	----	.90	0.18	11.77	4.5	220.	23,800
40	5th	----	1.71	2.21	10.15	4.8	320.	40,800
50	5th	----	2.75	4.17	9.30	4.2	260.	47,800
0	N	1940	0	4.02	6.25	7.5	9.3	111.000

Notes: Head Temp. reached approx. 250°C during 40 mph steady state

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki TS 100

Date 11/02/76 Sequence Rich Adjustment

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1500	----	5.23	2.73	7.8	12.3	160,000 +
20	2nd	----	0.42	8.03	5.41	5.3	14.1	89,600
30	4th	----	0.94	9.13	6.33	4.0	10.5	58,400
40	5th	----	1.77	9.75	5.67	4.0	11.5	61,100
50	5th	----	3.02	9.62	6.17	3.8	34.5	53,600
0	N	----	----	5.78	2.73	7.6	15.0	160,000 +

Notes: Head temperature reached approximately 180°C during 40 mph steady state
+ emission exceeds highest range

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Suzuki TS 100

Date 11/29/76 Sequence Advanced Timing Adjustment

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	----	----	4.97	2.94	8.0	11.	131,000
20	2nd	----	0.40	7.81	6.33	4.8	13.	51,600
30	4th	----	0.95	8.12	7.02	3.8	14.	44,000
40	5th	----	1.74	8.66	6.17	4.3	24.	55,200
50	5th	----	----	----	----	----	---	--------
0	N	----	----	5.16	3.00	7.6	12.	125,000

Notes: Head temperature reached approximately 230°C during 40 mph steady state
50 mph steady state not performed because temperature exceeded 275°C

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                   TABLE                         VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  100        TEST NO. 1          DATE 10/21/76                         MFGR. CODE   -0                         YR.  1976
VEHICLE MODEL  SUZUKI TS 100 LEAN        ENGINE    .10 LITRE 1                 CURB WT.     0 KG                       GVM     0 KG

BAROMETER 745.74 MM OF HG.                                                  WET BULB TEMP  14.4 DEG. C
DRY BULB TEMP.    26.7 DEG. C                                               ABS. HUMIDITY   5.2 GRAMS/KG
REL. HUMIDITY      24 PCT.                                                  DYNO ROLL CONSTANT    967.97

EXHAUST EMISSIONS
                                                                            BLOWER INLET PRESS., G1 127.0 MM. H2O
   BLOWER DIF. PRESS., G2, 142.2 MM. H2O                                    BLOWER INLET TEMP.    43 DEG. C
   BAG RESULTS
   BAG NO.                                        1                2                 3
   BLOWER REVOLUTIONS                           3300              5344              3167
   ROLL COUNTS                                   2847              3782              2838
   HC   SAMPLE  METER READING/SCALE             25.6/4            15.0/4            21.4/4
   HC   SAMPLE  PPM                             2560              1500              2140
   HC   BACKGRD METER READING/SCALE              1.6/3             2.8/3             2.8/3
   HC   BACKGRD PPM                              16                28                28
   CO   SAMPLE  METER READING/SCALE             26.5/3            19.2/3            29.6/3
   CO   SAMPLE  PPM                              619               440               696
   CO   BACKGRD METER READING/SCALE               .3/3              .3/3             0.0/3
   CO   BACKGRD PPM                               6                 6                 0
   CO2  SAMPLE  METER READING/SCALE             31.6/3            25.1/3            29.7/3
   CO2  SAMPLE  PERCENT                          .52               .41               .49
   CO2  BACKGRD METER READING/SCALE              4.1/3             4.3/3             4.4/3
   CO2  BACKGRD PERCENT                          .06               .07               .07
   NOX  SAMPLE  METER READING/SCALE             10.1/2             6.0/2             9.9/2
   NOX  SAMPLE  PPM                             10.1               6.0               9.9
   NOX  BACKGRD METER READING/SCALE               .9/2              .9/2              .9/2
   NOX  BACKGRD PPM                               .9                .9                .9
   SO2  SAMPLE  METER READING/SCALE             -0.0/*            -0.0/*            -0.0/*
   SO2  SAMPLE  PPM                              0.0               0.0               0.0
   SO2  BACKGRD METER READING/SCALE             -0.0/*            -0.0/*            -0.0/*
   SO2  BACKGRD PPM                              0.0               0.0               0.0

   HC   CONCENTRATION PPM                       2545              1473              2114
   CO   CONCENTRATION PPM                        602               427               684
   CO2  CONCENTRATION PCT                        .47               .35               .43
   NOX  CONCENTRATION PPM                        9.3               5.1               9.1
   SO2  CONCENTRATION PPM                        0.0               0.0               0.0
   HC   MASS GRAMS                              36.31             34.03             28.93
   CO   MASS GRAMS                              17.33             19.91             18.92
   CO2  MASS GRAMS                             211.64            255.04            186.29
   NOX  MASS GRAMS                               .37               .33               .35
   SO2  MASS GRAMS                              0.00              0.00              0.00
   TOTAL CARBON GRAMS                           96.62            107.60             83.97

   WEIGHTED MASS HC       6.01 GRAMS/KILOMETRE
   WEIGHTED MASS CO       3.46 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     41.07 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .06 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE        11.01 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  35.6  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST              288.19 GRAMS
   ESTIMATED FUEL WEIGHT =   .33KG.
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        TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 100

DATE 10/21/76                TIME    -0 HRS.           TEST NO.  1
MODEL  1976 SUZUKI TS 100  FET LEAN                    ENGINE  .1 LITRE  1
DRIVER   JB                  TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  14 C          DRY BULB TEMP  27 C       REL. HUM.  23.7 PCT
SPEC. HUM.    5.2 GRAM/KG    BARO.  745.7 MM  HG.      MEASURED FUEL  0.00 KG

 RUN DURATION           12.84 MINUTES
 BLOWER INLET PRESS.   127.0  MM. H2O
 BLOWER DIF.  PRESS.   152.4  MM  H2O
 BLOWER INLET TEMP.       43  DEG. C
 DYNO REVOLUTIONS       9650
 DISTANCE TRAVELED     16.04  KILOMETRES
 BLOWER REVOLUTIONS      4835
 BLOWER CU. CM /REV.   8296

 BAG RESULTS
  HC   SAMPLE  METER READING/SCALE                  79.8/4
  HC   SAMPLE  PPM                                  7980
  HC   BACKGRD METER READING/SCALE                    .4/4
  HC   BACKGRD PPM                                    40
  CO   SAMPLE  METER READING/SCALE                  75.7/1
  CO   SAMPLE  PPM                                  8677
  CO   BACKGRD METER READING/SCALE                    .1/1
  CO   BACKGRD PPM                                     5
  CO2 SAMPLE  METER READING/SCALE                   59.4/3
  CO2 SAMPLE  PERCENT                               1.05
  CO2 BACKGRD METER READING/SCALE                    3.0/3
  CO2 BACKGRD PERCENT                                .05
  NOX SAMPLE  METER READING/SCALE                   18.9/2
  NOX SAMPLE  PPM                                   18.9
  NOX BACKGRD METER READING/SCALE                     .7/2
  NOX BACKGRD PPM                                     .7
  HC   CONCENTRATION PPM                           7948
  CO   CONCENTRATION PPM                           8431
  CO2 CONCENTRATION PCT                            1.01
  NOX CONCENTRATION PPM                            18.3
  SO2 COCENTRATION PPM                             0.0
  HC   MASS (GRAMS)                               165.02
  CO   MASS (GRAMS)                               353.41
  CO2 MASS (GRAMS)                                671.53
  NOX MASS (GRAMS)                                  1.07
  SO2 MASS (GRAMS)                                  0.00

HC   GRAMS/KILOMETRE     10.29
CO   GRAMS/KILOMETRE     22.03
CO2 GRAMS/KILOMETRE     41.86
NOX GRAMS/KILOMETRE       .07
SO2 GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL  48.89      HC   GRAMS/MIN  12.86
CO   GRAMS/KG OF FUEL  640.1      CO   GRAMS/MIN   27.5
CO2 GRAMS/KG OF FUEL   1216      CO2 GRAMS/MIN     52
NOX GRAMS/KG OF FUEL   1.44      NOX GRAMS/MIN    .08
SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY
                                               21.34  KILOMETRES/LITRE
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                    TABLE                              VEHICLE EMISSION RESULTS
                                               1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  100         TEST NO. 1       DATE 11/ 3/76
VEHICLE MODEL  TS 100  RICH            ENGINE    .10 LITRE 1           MFGR. CODE   -0                   YR.  1976
                                                                       CURB WT.      0 KG                GVW     0 KG
BAROMETER 746.51 MM OF HG.
DRY BULB TEMP.    26.7 DEG. C                                     WET BULB TEMP  17.8 DEG. C
REL. HUMIDITY     41 PCT.                                         ABS. HUMIDITY   9.1 GRAMS/KG
                                                                  DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 304.8 MM, H2O                         BLOWER INLET PRESS., G1 254.0 MM, H2O
    BAG RESULTS                                                   BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                     1              2              3
    BLOWER REVOLUTIONS                       3181           5444           2993
    ROLL COUNTS                               2803           3691           2761
    HC   SAMPLE  METER READING/SCALE        34.3/4         27.4/4         32.3/4
    HC   SAMPLE  PPM                         3430           2790           3230
    HC   BACKGRD METER READING/SCALE          .3/4           .3/4           .4/4
    HC   BACKGRD PPM                           30             30             40
    CO   SAMPLE  METER READING/SCALE        76.8/2         69.5/2         79.5/2
    CO   SAMPLE  PPM                         4462           3843           4699
    CO   BACKGRD METER READING/SCALE          .1/2           .1/2           .1/2
    CO   BACKGRD PPM                            4              4              4
    CO2  SAMPLE  METER READING/SCALE        22.7/3         18.2/3         22.1/3
    CO2  SAMPLE  PERCENT                      .37            .29            .36
    CO2  BACKGRD METER READING/SCALE         3.2/3          2.9/3          2.9/3
    CO2  BACKGRD PERCENT                      .05            .04            .04
    NOX  SAMPLE  METER READING/SCALE         2.6/2          2.1/2          2.7/2
    NOX  SAMPLE  PPM                          2.6            2.1            2.7
    NOX  BACKGRD METER READING/SCALE          .9/2           .7/2           .7/2
    NOX  BACKGRD PPM                           .9             .7             .7
    SO2  SAMPLE  METER READING/SCALE        -0.0/*         -0.0/*         -0.0/*
    SO2  SAMPLE  PPM                          0.0            0.0            0.0
    SO2  BACKGRD METER READING/SCALE        -0.0/*         -0.0/*         -0.0/*
    SO2  BACKGRD PPM                          0.0            0.0            0.0

    HC   CONCENTRATION PPM                   3403           2762           3193
    CO   CONCENTRATION PPM                   4367           3766           4601
    CO2  CONCENTRATION PCT                    .32            .25            .32
    NOX  CONCENTRATION PPM                    1.8            1.4            2.1
    SO2  CONCENTRATION PPM                    0.0            0.0            0.0
    HC   MASS GRAMS                         42.20          58.63          37.27
    CO   MASS GRAMS                        109.36         161.41         108.41
    CO2  MASS GRAMS                        127.73         169.20         117.92
    NOX  MASS GRAMS                           .07            .10            .08
    SO2  MASS GRAMS                          0.00           0.00           0.00
    TOTAL CARBON GRAMS                     118.28         166.14         110.93

    WEIGHTED MASS HC      4.11 GRAMS/KILOMETRE
    WEIGHTED MASS CO     25.13 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    27.09 GRAMS/KILOMETRE
    WEIGHTED MASS NOX      .02 GRAMS/KILOMETRE
    WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE      10.76 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  24.8  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              395.35 GRAMS
    ESTIMATED FUEL WEIGHT =   .46KG.
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       TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 100

DATE 11/ 3/76              TIME     -0 HRS.        TEST NO.  1
MODEL  1976 SUZUKI TS 100  FET  RICH               ENGINE  .1 LITRE  1
DRIVER   JB                TEST WT.      0 KG.     GVW     0 KG
WET BULB TEMP  17 C        DRY BULB TEMP  27 C     REL. HUM.  35.9 PCT
SPEC. HUM.   8.2 GRAM/KG   BARO.  745.0 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION          12.74 MINUTES
  BLOWER INLET PRESS.   127.0  MM. H20
  BLOWER DIF.  PRESS.   152.4  MM  H20
  BLOWER INLET TEMP.       43  DEG. C
  DYNO REVOLUTIONS      9650
  DISTANCE TRAVELED   16.04  KILOMETRES
  BLOWER REVOLUTIONS      4800
  BLOWER CU. CM /REV.  8296

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                90.0/4
   HC  SAMPLE  PPM                                9000
   HC  BACKGRD METER READING/SCALE                  .5/4
   HC  BACKGRD PPM                                  50
   CO  SAMPLE  METER READING/SCALE                85.9/1
   CO  SAMPLE  PPM                               11367
   CO  BACKGRD METER READING/SCALE                  .1/1
   CO  BACKGRD PPM                                   5
   CO2 SAMPLE  METER READING/SCALE                47.8/3
   CO2 SAMPLE  PERCENT                              .82
   CO2 BACKGRD METER READING/SCALE                3.1/3
   CO2 BACKGRD PERCENT                              .05
   NOX SAMPLE  METER READING/SCALE                8.5/2
   NOX SAMPLE  PPM                                8.5
   NOX BACKGRD METER READING/SCALE                  .8/2
   NOX BACKGRD PPM                                  .8
   HC  CONCENTRATION PPM                          8961
   CO  CONCENTRATION PPM                         11050
   CO2 CONCENTRATION PCT                            .79
   NOX CONCENTRATION PPM                           7.9
   SO2 COCENTRATION PPM                           0.0
   HC  MASS (GRAMS)                              184.49
   CO  MASS (GRAMS)                              459.35
   CO2 MASS (GRAMS)                              516.97
   NOX MASS (GRAMS)                                 .50
   SO2 MASS (GRAMS)                                0.00

 HC  GRAMS/KILOMETRE      11.50
 CO  GRAMS/KILOMETRE      28.64
 CO2 GRAMS/KILOMETRE      32.23
 NOX GRAMS/KILOMETRE        .03
 SO2 GRAMS/KILOMETRE       0.00

 HC  GRAMS/KG OF FUEL  *0.67     HC  GRAMS/MIN  14.48
 CO  GRAMS/KG OF FUEL  798.4     CO  GRAMS/MIN   36.1
 CO2 GRAMS/KG OF FUEL    899     CO2 GRAMS/MIN     41
 NOX GRAMS/KG OF FUEL    .86     NOX GRAMS/MIN    .04
 SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                    20.48  KILOMETRES/LITRE
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                   TABLE                                 VEHICLE EMISSION RESULTS
                                                  1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  100        TEST NO. 1          DATE 11/30/76                          MFGR. CODE    -0                   YR.  1976
VEHICLE MODEL  TS100 ADVANCE 05          ENGINE     .10 LITRE 1                 CURB WT.       0 KG                GVM      0 KG

BAROMETER 749.55 MM OF HG.                                                    WET BULB TEMP  11.7 DEG. C
DRY BULB TEMP.    25.6 DEG. C                                                 ABS. HUMIDITY   2.8 GRAMS/KG
REL. HUMIDITY      19 PCT.                                                    DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                              BLOWER INLET PRESS., G1 127.0 MM. H20
    BLOWER DIF. PRESS., G2, 152.4 MM. H20                                     BLOWER INLET TEMP.    43 DEG. C
    BAG RESULTS
    BAG NO.                                        1                  2                  3
    BLOWER REVOLUTIONS                          3177               5458               3178
    ROLL COUNTS                                  2794               3757               2815
    HC   SAMPLE  METER READING/SCALE            12.7/4             12.5/4             11.8/4
    HC   SAMPLE  PPM                            1270               1250               1180
    HC   BACKGRD METER READING/SCALE              .8/3              1.0/3              1.4/3
    HC   BACKGRD PPM                               8                 10                 14
    CO   SAMPLE  METER READING/SCALE            92.9/3             85.2/3             97.7/3
    CO   SAMPLE  PPM                            2709               2369               2954
    CO   BACKGRD METER READING/SCALE              .1/3               .6/3               .4/3
    CO   BACKGRD PPM                               2                 13                  9
    CO2  SAMPLE  METER READING/SCALE            23.5/3             19.6/3             24.9/3
    CO2  SAMPLE  PERCENT                         .38                .31                .40
    CO2  BACKGRD METER READING/SCALE             3.5/3              4.6/3              3.6/3
    CO2  BACKGND PERCENT                         .05                .07                .06
    NOX  SAMPLE  METER READING/SCALE             4.0/2              2.4/2              3.6/2
    NOX  SAMPLE  PPM                             4.0                2.4                3.6
    NOX  BACKGRD METER READING/SCALE              .5/2               .6/2               .5/2
    NOX  BACKGRD PPM                              .5                 .6                 .5
    SO2  SAMPLE  METER READING/SCALE            -0.0/*             -0.0/*             -0.0/*
    SO2  SAMPLE  PPM                             0.0                0.0                0.0
    SO2  BACKGRD METER READING/SCALE            -0.0/*             -0.0/*             -0.0/*
    SO2  BACKGRD PPM                             0.0                0.0                0.0

    HC   CONCENTRATION PPM                      1262               1241               1167
    CO   CONCENTRATION PPM                      2676               2332               2911
    CO2  CONCENTRATION PCT                       .33                .25                .35
    NOX  CONCENTRATION PPM                       3.5                1.8                3.1
    SO2  CONCENTRATION PPM                       0.0                0.0                0.0
    HC   MASS GRAMS                            17.32              29.24              16.01
    CO   MASS GRAMS                            74.12             110.99              80.66
    CO2  MASS GRAMS                           144.83             186.16             151.11
    NOX  MASS GRAMS                              .13                .11                .11
    SO2  MASS GRAMS                             0.00               0.00               0.00
    TOTAL CARBON GRAMS                         86.30             123.71              89.69

    WEIGHTED MASS HC      4.20 GRAMS/KILOMETRE
    WEIGHTED MASS CO     17.31 GRAMS/KILOMETRE
    WEIGHTED MASS CO2    30.67 GRAMS/KILOMETRE
    WEIGHTED MASS NOX      .02 GRAMS/KILOMETRE
    WEIGHTED MASS SO2     0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       10.91 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  33.2  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST               299.70 GRAMS
    ESTIMATED FUEL WEIGHT =   .35KG.
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      TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 100

DATE 11/30/76              TIME    -0 HRS.          TEST NO.  1
MODEL  1976 SUZUKI TS 100  FET ADVANCED  05         ENGINE  .1 LITRE  1
DRIVER   TJ                TEST WT.     0 KG.       GVW    0 KG
WET BULB TEMP  12 C        DRY BULB TEMP  26 C      REL. HUM.  13.4 PCT
SPEC. HUM.   2.7 GRAM/KG   BARO.  751.8 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION          12.77 MINUTES
  BLOWER INLET PRESS.  127.0  MM. H20
  BLOWER DIF.  PRESS.  152.4  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      4067
  DISTANCE TRAVELED   15.07  KILOMETRES
  BLOWER REVOLUTIONS     4809
  BLOWER CU. CM /REV.  8303

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE               38.9/4
   HC  SAMPLE  PPM                               3890
   HC  BACKGRD METER READING/SCALE                2.5/3
   HC  BACKGRD PPM                                 25
   CO  SAMPLE  METER READING/SCALE               72.1/1
   CO  SAMPLE  PPM                               7907
   CO  BACKGRD METER READING/SCALE                 .1/1
   CO  BACKGRD PPM                                  5
   CO2 SAMPLE  METER READING/SCALE               47.7/3
   CO2 SAMPLE  PERCENT                            .82
   CO2 BACKGRD METER READING/SCALE                3.6/3
   CO2 BACKGRD PERCENT                            .06
   NOX SAMPLE  METER READING/SCALE               15.3/2
   NOX SAMPLE  PPM                               15.3
   NOX BACKGRD METER READING/SCALE                 .6/2
   NOX BACKGRD PPM                                 .6
   HC  CONCENTRATION PPM                         3869
   CO  CONCENTRATION PPM                         7743
   CO2 CONCENTRATION PCT                          .78
   NOX CONCENTRATION PPM                         14.8
   SO2 COCENTRATION PPM                          0.0
   HC  MASS (GRAMS)                             80.62
   CO  MASS (GRAMS)                            325.75
   CO2 MASS (GRAMS)                            515.59
   NOX MASS (GRAMS)                               .81
   SO2 MASS (GRAMS)                              0.00

HC  GRAMS/KILOMETRE      5.35
CO  GRAMS/KILOMETRE     21.61
CO2 GRAMS/KILOMETRE     34.21
NOX GRAMS/KILOMETRE       .05
SO2 GRAMS/KILOMETRE      0.00

HC  GRAMS/KG OF FUEL  49.16     HC  GRAMS/MIN   6.31
CO  GRAMS/KG OF FUEL  804.7     CO  GRAMS/MIN   25.5
CO2 GRAMS/KG OF FUEL   1274     CO2 GRAMS/MIN     40
NOX GRAMS/KG OF FUEL   2.00     NOX GRAMS/MIN    .06
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                    27.35  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Yamaha RD 400

Date 10/20/76 Sequence Baseline

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1150	0	3.81	8.30	8.8	11.	160,000
20	2	3300	0.45	3.17	7.46	6.5	10.	88,000
30	3	3700	1.01	1.71	9.70	5.5	9.	50,900
40	4	4000	1.93	2.34	10.77	4.2	11.	32,800
50	5	4500	3.05	2.56	11.48	3.3	26.	23,400
60	6	4950	4.46	2.52	11.33	3.5	100.	49,600
0	N	1300	0	3.72	5.53	8.8	12.	135,200

Notes: Right ○ Left ○ Slide Alignment
Head temp. reached 190°C during 60 mph steady state

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Yamaha RD 400

Date 10/21/76 Sequence Lean Adjustment

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1250	0	3.00	5.53	8.5	9.	134,000
20	2	3300	0.45	1.21	8.78	7.0	10.	52,000
30	3	3600	1.02	0.59	10.33	6.0	20.	35,200
40	4	3900	1.93	0.24	11.79	4.4	10.	20,600
50	5	4400	3.12	0.18	12.10	4.7	45.	16,700
60	6	4900	4.48	1.06	11.60	4.5	190.	19,600
0	N	1400	0	2.37	6.80	8.8	12.	92,800

Notes: ○ Right ○ Left Clip moved up 1 notch, pilot air screw turned out 180
Head temp reached 220°C during 60 mph steady state

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Yamaha RD 400

Date 11/04/76 Sequence Rich Adjustment

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1200	----	4.67	4.35	7.7	11.	132,800
20	2	3200	0.44	4.61	6.84	6.1	10.	80,000
30	3	3700	1.01	4.44	7.92	6.1	10.	62,400
40	4	4000	1.93	5.56	8.30	4.0	11.	49,600
50	5	4400	3.15	8.33	7.37	3.6	12.	53,600
60	6	4900	4.54	9.50	7.28	2.9	17.	42,000
0	N	1200	----	4.44	4.64	7.7	13.	122,500

Notes: Clips moved down 1 notch for neutral
Pilot air screws turned in 1/2 turn
Head temperature reached 175°C during 60 mph steady state

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Yamaha RD 400

Date 11/30/76 Sequence Advanced Timing Adjustment

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1000	---	3.57	3.94	9.4	11.	89,600
20	2	3400	0.43	2.45	7.55	9.4	11.	66,400
30	3	3750	1.01	1.52	9.28	6.3	13.	48,400
40	4	4100	1.95	2.56	10.01	4.5	15.	34,000
50	5	4500	3.14	2.12	11.33	3.7	40.	22,200
60	6	5000	4.56	3.04	10.12	4.7	90.	25,200
0	N	1100	----	2.68	5.07	10.4	12.	76,800

Notes: Recommended timing is 2.3 mm BTC - base run at approx. 1.8-2.0 mm, reset to 2.8 mm
Carburetor set to normal settings

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                         TABLE                       VEHICLE EMISSION RESULTS
                                                 1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  500        TEST NO. 1          DATE 11/ 4/76                          MFGR. CODE   -0                  YR.  1976
VEHICLE MODEL  RD 400  LEAN              ENGINE     .39 LITRE 2                 CURB WT.      0 KG               GVW     0 KG

BAROMETER 746.76 MM OF HG.                                               WET BULB TEMP  13.9 DEG. C
DRY BULB TEMP.    24.4 DEG. C                                            ABS. HUMIDITY   5.5 GRAMS/KG
REL. HUMIDITY      29 PCT.                                               DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                         BLOWER INLET PRESS., G1 457.2 MM. H2O
    BLOWER DIF. PRESS., G2, 482.6 MM. H2O                                BLOWER INLET TEMP.   43 DEG. C
    BAG RESULTS
    BAG NO.                                        1             2             3
    BLOWER REVOLUTIONS                          6028         10593          6266
    ROLL COUNTS                                 3450          3738          3458
    HC   SAMPLE  METER READING/SCALE          21.0/4        19.6/4        16.7/4
    HC   SAMPLE  PPM                          2100          1960          1670
    HC   BACKGRD METER READING/SCALE            .6/4          .8/4          .5/4
    HC   BACKGRD PPM                            60            80            50
    CO   SAMPLE  METER READING/SCALE          75.8/*        80.7/*        76.2/*
    CO   SAMPLE  PPM                           334           369           337
    CO   BACKGRD METER READING/SCALE            .8/*.         .4/*          .3/*
    CO   BACKGPD PPM                             2             1             1
    CO2  SAMPLE  METER READING/SCALE          33.8/3        20.0/3        31.1/3
    CO2  SAMPLE  PERCENT                       .56           .32           .52
    CO2  BACKGRD METER READING/SCALE           2.9/3         1.8/3         2.1/3
    CO2  BACKGRD PERCENT                       .04           .03           .03
    NOX  SAMPLE  METER READING/SCALE           2.4/2          .9/2         3.9/2
    NOX  SAMPLE  PPM                           2.4            .9           3.9
    NOX  BACKGRD METER READING/SCALE            .4/2          .1/2          .6/2
    NOX  BACKGRD PPM                            .4            .1            .6
    SO2  SAMPLE  METER READING/SCALE          -0.0/*        -0.0/*        -0.0/*
    SO2  SAMPLE  PPM                           0.0           0.0           0.0
    SO2  BACKGRD METER READING/SCALE          -0.0/*        -0.0/*        -0.0/*
    SO2  BACKGRD PPM                           0.0           0.0           0.0

    HC   CONCENTPATION PPM                    2044          1383          1623
    CO   CONCENTRATION PPM                     325           362           330
    CO2  CONCENTRATION PCT                     .52           .30           .48
    NOX  CONCENTRATION PPM                     2.0            .8           3.3
    SO2  CONCENTRATION PPM                     0.0           0.0           0.0
    HC   MASS GRAMS                          50.03         59.50         41.29
    CO   MASS GRAMS                          16.08         31.42         16.99
    CO2  MASS GRAMS                         407.67        404.99        393.51
    NOX  MASS GRAMS                            .14           .10           .24
    SO2  MASS GRAMS                           0.00          0.00          0.00
    TOTAL CARRON GRAMS                      161.47        175.51        150.40

    WEIGHTED MASS HC       8.74 GRAMS/KILOMETRE
    WEIGHTED MASS CO       4.01 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     67.30 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .02 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       11.96 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  23.2  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST            487.38 GRAMS
    ESTIMATED FUEL WEIGHT =   .56KG.
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   TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 500

DATE 11/ 1/76             TIME     -0 HRS.          TEST NO.  1
MODEL  1976 RD 400 LEAN   MIWAY CYCLE               ENGINE  .4 LITRE  2
DRIVER   J8               TEST WT.      0 KG.       GVW     0 KG
WET BULB TEMP  15 C       DRY BULB TEMP  25 C       REL. HUM.  32.7 PCT
SPEC. HUM.   6.5 GRAM/KG  BARO.  746.3 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION           12.79 MINUTES
  BLOWER INLET PRESS.  962.3  MM. H2O
  BLOWER DIF.  PRESS.  987.7  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS       9952
  DISTANCE TRAVELED   16.54  KILOMETRES
  BLOWER REVOLUTIONS      9504
  BLOWER CU. CM /REV.  8094

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE            22.1/4
   HC   SAMPLE  PPM                            2210
   HC   BACKGRD METER READING/SCALE              .1/4
   HC   BACKGRD PPM                              10
   CO   SAMPLE  METER READING/SCALE            20.7/3
   CO   SAMPLE  PPM                             476
   CO   BACKGRD METER READING/SCALE              .3/3
   CO   BACKGRD PPM                               6
   CO2 SAMPLE  METER READING/SCALE             54.2/3
   CO2 SAMPLE  PERCENT                          .95
   CO2 BACKGRD METER READING/SCALE              4.0/3
   CO2 BACKGRD PERCENT                          .06
   NOX SAMPLE  METER READING/SCALE             10.4/2
   NOX SAMPLE  PPM                             10.4
   NOX BACKGRD METER READING/SCALE              1.1/2
   NOX BACKGRD PPM                              1.1
   HC   CONCENTRATION PPM                      2201
   CO   CONCENTRATION PPM                       457
   CO2 CONCENTRATION PCT                        .89
   NOX CONCENTRATION PPM                        9.4
   SO2 COCENTRATION PPM                         0.0
   HC   MASS (GRAMS)                          84.76
   CO   MASS (GRAMS)                          35.51
   CO2 MASS (GRAMS)                         1096.33
   NOX MASS (GRAMS)                            1.06
   SO2 MASS (GRAMS)                            0.00

HC   GRAMS/KILOMETRE       5.12
CO   GRAMS/KILOMETRE       2.15
CO2 GRAMS/KILOMETRE      66.27
NOX GRAMS/KILOMETRE        .06
SO2 GRAMS/KILOMETRE       0.00

HC   GRAMS/KG OF FUEL  49.07       HC   GRAMS/MIN    6.63
CO   GRAMS/KG OF FUEL   79.2       CO   GRAMS/MIN    2.8
CO2 GRAMS/KG OF FUEL   2446       CO2 GRAMS/MIN    86
NOX GRAMS/KG OF FUEL   2.35       NOX GRAMS/MIN     .08
SO2 GRAMS/KG OF FUEL   0.00       SO2 GRAMS/MIN    0.00
CARBON BALANCE FUEL ECONOMY                       27.11  KILOMETRES/LITRE
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                    TABLE                       VEHICLE EMISSION RESULTS
                                           1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  500         TEST NO. 1         DATE 11/ 5/76                  MFGR. CODE   -0                 YR.  1976
VEHICLE MODEL  RD 400  RICH              ENGINE     .39 LITRE 2         CURB WT.      0 KG              GVM      0 KG

BAROMETER 742.27 MM OF HG.                                       WET BULB TEMP  15.0 DEG. C
DRY BULB TEMP.   24.4 DEG. C                                     ABS. HUMIDITY   6.8 GRAMS/KG
REL. HUMIDITY     39 PCT.                                        DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS

   BLOWER DIF. PRESS., G2. 485.1 MM. H20                         BLOWER INLET PRESS., G1 457.2 MM. H20
   BAG RESULTS                                                   BLOWER INLET TEMP.   43 DEG. C
   BAG NO.                                  1              2              3
   BLOWER REVOLUTIONS                    6283          10745           6278
   ROLL COUNTS                            3484           3743            3480
   HC    SAMPLE  METER READING/SCALE     29.5/4         22.2/4         27.7/4
   HC    SAMPLE  PPM                     2950           2220           2770
   HC    BACKGRD METER READING/SCALE      1.6/3          1.2/3          1.5/3
   HC    BACKGRD PPM                      16             12             15
   CO    SAMPLE  METER READING/SCALE     44.8/1         26.4/1         44.8/1
   CO    SAMPLE  PPM                     3707           1837           3707
   CO    BACKGRD METER READING/SCALE       .1/1           .3/1           .1/2
   CO    BACKGRD PPM                       5             16              4
   CO2   SAMPLE  METER READING/SCALE     25.3/3         14.9/3         23.4/3
   CO2   SAMPLE  PERCENT                  .41            .24            .38
   CO2   BACKGRD METER READING/SCALE     2.2/3          2.8/3          2.2/3
   CO2   BACKGRD PERCENT                  .03            .04            .03
   NOX   SAMPLE  METER READING/SCALE     2.4/2          1.4/2          2.0/2
   NOX   SAMPLE  PPM                     2.4            1.4            2.0
   NOX   BACKGRD METER READING/SCALE      .3/2           .6/2           .5/2
   NOX   BACKGRD PPM                      .3             .6             .5
   SO2   SAMPLE  METER READING/SCALE    -0.0/*         -0.0/*         -0.0/*
   SO2   SAMPLE  PPM                     0.0            0.0            0.0
   SO2   BACKGRD METER READING/SCALE    -0.0/*         -0.0/*         -0.0/*
   SO2   BACKGRD PPM                     0.0            0.0            0.0

   HC    CONCENTRATION PPM               2935           2209           2756
   CO    CONCENTRATION PPM               3631           1793           3635
   CO2   CONCENTRATION PCT                .38            .20            .35
   NOX   CONCENTRATION PPM               2.1             .8            1.5
   SO2   CONCENTRATION PPM               0.0            0.0            0.0
   HC    MASS GRAMS                     74.92          96.40          70.29
   CO    MASS GRAMS                    187.12         150.03         187.15
   CO2   MASS GRAMS                    310.84         271.97         283.66
   NOX   MASS GRAMS                      .16            .11            .12
   SO2   MASS GRAMS                     0.00           0.00           0.00
   TOTAL CARBON GRAMS                  229.93         225.44         218.51

   WEIGHTED MASS HC      14.05 GRAMS/KILOMETRE
   WEIGHTED MASS CO      28.74 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     47.24 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .02 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE       12.01 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  17.2  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST            673.88 GRAMS
   ESTIMATED FUEL WEIGHT =   .78KG.
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     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 500

DATE 11/ 5/76                 TIME     -0 HRS.          TEST NO.  1
MODEL  1976 YAMAHA RD 400     FET  RICH                 ENGINE  .4 LITRE  2
DRIVER   TJ                   TEST WT.       0 KG.      GVW    0 KG
WET BULB TEMP  15 C           DRY BULB TEMP  27 C       REL. HUM.  26.5 PCT
SPEC. HUM.   5.8 GRAM/KG      BARO.  746.5 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION          12.75 MINUTES
  BLOWER INLET PRESS.  457.2  MM. H2O
  BLOWER DIF.  PRESS.  485.1  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9928
  DISTANCE TRAVELED   16.50  KILOMETRES
  BLOWER REVOLUTIONS     9482
  BLOWER CU. CM /REV.  8098

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              34.2/4
   HC   SAMPLE  PPM                              3420
   HC   BACKGRD METER READING/SCALE               1.6/3
   HC   BACKGRD PPM                                16
   CO   SAMPLE  METER READING/SCALE              67.3/1
   CO   SAMPLE  PPM                              6984
   CO   BACKGRD METER READING/SCALE                .1/2
   CO   BACKGRD PPM                                 4
   CO2  SAMPLE  METER READING/SCALE              39.3/3
   CO2  SAMPLE  PERCENT                           .66
   CO2  BACKGRD METER READING/SCALE               3.2/3
   CO2  BACKGRD PERCENT                           .05
   NOX  SAMPLE  METER READING/SCALE               3.5/2
   NOX  SAMPLE  PPM                               3.5
   NOX  BACKGRD METER READING/SCALE                .7/2
   NOX  BACKGRD PPM                                .7
   HC   CONCENTRATION PPM                        3406
   CO   CONCENTRATION PPM                        6831
   CO2  CONCENTRATION PCT                         .62
   NOX  CONCENTRATION PPM                         2.9
   SO2  COCENTRATION PPM                          0.0
   HC   MASS (GRAMS)                           131.05
   CO   MASS (GRAMS)                           530.45
   CO2  MASS (GRAMS)                           742.98
   NOX  MASS (GRAMS)                              .32
   SO2  MASS (GRAMS)                             0.00

HC   GRAMS/KILOMETRE      7.94
CO   GRAMS/KILOMETRE     32.16
CO2  GRAMS/KILOMETRE     46.23
NOX  GRAMS/KILOMETRE       .02
SO2  GRAMS/KILOMETRE      0.00

HC   GRAMS/KG OF FUEL  46.42     HC   GRAMS/MIN  10.27
CO   GRAMS/KG OF FUEL  835.9     CO   GRAMS/MIN   41.6
CO2  GRAMS/KG OF FUEL   1202     CO2  GRAMS/MIN     60
NOX  GRAMS/KG OF FUEL    .50     NOX  GRAMS/MIN    .02
SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                 19.10  KILOMETRES/LITRE
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                       TABLE                        VEHICLE EMISSION RESULTS
                                                1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  500        TEST NO. 1           DATE 12/ 1/76                    MFGR. CODE    -0
VEHICLE MODEL  RD-400 ADVANCED7           ENGINE      .39 LITRE 2           CURB WT.      0 KG                     YR.  1976
                                                                                                                   GVW       0 KG
BAROMETER 748.03 MM OF HG.
DRY BULB TEMP.    26.1 DEG. C                                       WET BULB TEMP  14.4 DEG. C
REL. HUMIDITY      26 PCT.                                          ABS. HUMIDITY   5.4 GRAMS/KG
                                                                    DYNO ROLL CONSTANT   467.97
EXHAUST EMISSIONS

   BLOWER DIF. PRESS., G2, 495.3 MM. H2O                            BLOWER INLET PRESS., G1 469.9 MM. H2O
   BAG RESULTS                                                      BLOWER INLET TEMP.   43 DEG. C
   BAG NO.                                       1                 2                  3
   BLOWER REVOLUTIONS                          6333             10750               6266
   ROLL COUNTS                                  3434              3711               3419
   HC    SAMPLE  METER READING/SCALE           18.1/4            14.3/4             15.7/4
   HC    SAMPLE  PPM                           1810              1430               1570
   HC    BACKGRD METER READING/SCALE             .1/4              .2/4               .1/4
   HC    BACKGRD PPM                            10                20                 10
   CO    SAMPLE  METER READING/SCALE           32.4/3            33.2/3             40.3/3
   CO    SAMPLE  PPM                            767               788                971
   CO    BACKGRD METER READING/SCALE             .1/3              .2/3               .2/3
   CO    BACKGRD PPM                             2                 4                  4
   CO2   SAMPLE  METER READING/SCALE           30.0/3            17.6/3             26.6/3
   CO2   SAMPLE  PERCENT                        .50               .28                .44
   CO2   BACKGRD METER READING/SCALE           3.6/3             3.0/3              2.5/3
   CO2   BACKGRD PERCENT                        .06               .05                .04
   NOX   SAMPLE  METER READING/SCALE           2.4/2             1.3/2              2.6/2
   NOX   SAMPLE  PPM                           2.4               1.3                2.6
   NOX   BACKGRD METER READING/SCALE             .5/2              .5/2               .5/2
   NOX   BACKGRD PPM                             .5                .5                 .5
   SO2   SAMPLE  METER READING/SCALE          -0.0/*            -0.0/*             -0.0/*
   SO2   SAMPLE  PPM                           0.0               0.0                0.0
   SO2   BACKGRD METER READING/SCALE          -0.0/*            -0.0/*             -0.0/*
   SO2   BACKGRD PPM                           0.0               0.0                0.0

   HC    CONCENTRATION PPM                     1801              1411               1561
   CO    CONCENTRATION PPM                      752               773                951
   CO2   CONCENTRATION PCT                      .44               .24                .40
   NOX   CONCENTRATION PPM                     1.9                .8                2.1
   SO2   CONCENTRATION PPM                     0.0               0.0                0.0
   HC    MASS GRAMS                           46.21             61.46              39.63
   CO    MASS GRAMS                           38.94             67.96              48.75
   CO2   MASS GRAMS                          362.96            329.16             323.33
   NOX   MASS GRAMS                             .14               .10                .15
   SO2   MASS GRAMS                            0.00              0.00               0.00
   TOTAL CARBON GRAMS                        155.75            172.18             143.95

   WEIGHTED MASS HC       8.76 GRAMS/KILOMETRE
   WEIGHTED MASS CO       9.48 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     56.44 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .02 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE        11.86 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  23.7  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST              471.38 GRAMS
   ESTIMATED FUEL WEIGHT =    .54KG.
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        TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                             VEHICLE NUMBER 500

DATE 12/ 1/76                   TIME     -0 HRS.          TEST NO.  1
MODEL  1976 YAMAHA RD 400  FET ADVANCE 07            ENGINE  .4 LITRE  2
DRIVER   JB                     TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  16 C             DRY BULB TEMP  28 C       REL. HUM.  23.7 PCT
SPEC. HUM.   5.8 GRAM/KG   BARO.  745.7 MM  HG.   MEASURED FUEL  0.00 KG

  RUN DURATION            12.76 MINUTES
  BLOWER INLET PRESS.  469.9  MM. H2O
  BLOWER DIF.  PRESS.  495.3  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9916
  DISTANCE TRAVELED    16.48  KILOMETRES
  BLOWER REVOLUTIONS     9484
  BLOWER CU. CM /REV.  8079

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                    19.6/4
   HC   SAMPLE  PPM                                    1960
   HC   BACKGRD METER READING/SCALE                      .2/4
   HC   BACKGRD PPM                                      20
   CO   SAMPLE  METER READING/SCALE                    69.1/3
   CO   SAMPLE  PPM                                    1792
   CO   BACKGRD METER READING/SCALE                      .1/3
   CO   BACKGRD PPM                                        2
   CO2  SAMPLE  METER READING/SCALE                    46.1/3
   CO2  SAMPLE  PERCENT                                 .79
   CO2  BACKGRD METER READING/SCALE                    3.5/3
   CO2  BACKGRD PERCENT                                 .05
   NOX  SAMPLE  METER READING/SCALE                    6.6/2
   NOX  SAMPLE  PPM                                     6.6
   NOX  BACKGRD METER READING/SCALE                     .6/2
   NOX  BACKGRD PPM                                      .6
   HC   CONCENTRATION PPM                              1942
   CO   CONCENTRATION PPM                              1749
   CO2  CONCENTRATION PCT                               .74
   NOX  CONCENTRATION PPM                               6.1
   SO2  COCENTRATION PPM                                0.0
   HC   MASS (GRAMS)                                  74.38
   CO   MASS (GRAMS)                                 135.25
   CO2  MASS (GRAMS)                                 908.04
   NOX  MASS (GRAMS)                                    .66
   SO2  MASS (GRAMS)                                   0.00

 HC   GRAMS/KILOMETRE      4.51
 CO   GRAMS/KILOMETRE      8.21
 CO2  GRAMS/KILOMETRE     55.09
 NOX  GRAMS/KILOMETRE       .04
 SO2  GRAMS/KILOMETRE      0.00

 HC   GRAMS/KG OF FUEL  43.80     HC   GRAMS/MIN    5.83
 CO   GRAMS/KG OF FUEL  316.1     CO   GRAMS/MIN    10.6
 CO2  GRAMS/KG OF FUEL   2122     CO2  GRAMS/MIN      71
 NOX. GRAMS/KG OF FUEL   1.54     NOX  GRAMS/MIN     .05
 SO2  GRAMS/KG OF FUEL   0.00     SO2  GRAMS/MIN    0.00
 CARBON BALANCE FUEL ECONOMY
                                              28.30  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda XL 125

Date 10/22/76 Sequence Baseline

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1375	----	1.75	10.88	4.1	70.	2,720
20	2	----	0.46	8.01	9.80	0.9	145.	4,240
30	4	----	0.93	11.82	7.80	0.7	130.	6,640
40	5	----	1.83	7.33	10.55	0.5	795.	3,240
50	5	----	3.00	4.28	12.14	0.3	2350.	3,320
0	N	1400	----	3.57	9.45	4.8	57.	3,560

Notes:

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda XL 125

Date 10/26/76 Sequence Lean Adjustment

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1800	----	0.67	11.89	4.0	90.	3,120
20	2	----	0.45	0.44	13.80	0.8	610.	560
30	4	----	0.98	4.28	11.95	0.4	1240.	2,400
40	5	----	1.81	5.23	11.90	0.3	1500.	2,420
50	5	----	2.79	2.64	12.90	0.5	3480.	2,280
0	N	----	----	0.97	12.14	3.3	60.	1,920

Notes: Idle air screw: out 1/2 turn
Clip moved up 1 notch to top notch
Idle Screw, in 1/2 turn, 1900 rpm required to keep running

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda XL 125

Date 11/02/76 Sequence Rich Adjustment

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1500	----	3.89	11.10	4.2	35.	7,680
20	---	----	0.41	+12.16	7.64	0.6	39.	8,480
30	---	----	0.96	+12.16	7.02	0.3	43.	5,920
40	---	----	1.82	11.68	8.88	0.2	180.	4,080
50	---	----	3.00	6.60	12.38	0.3	1225.	3,360
0	N	----	----	8.22	9.28	2.7	44.	8,800

Notes: Idle air screw: in 1/2 turn

Clip moved down 1 notch from neutral

Idle speed screw adjusted as required to keep running

+ emission exceeds highest range

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Honda XL 125

Date 11/18/76 Sequence Advanced Timing Adjustment

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	-----	----	4.33	10.55	3.1	46.	5,600
20	2	-----	0.38	7.61	10.33	0.3	165.	3,600
30	4	-----	0.92	8.01	9.95	0.3	530.	4,120
40	5	-----	1.82	8.60	9.70	0.2	1225.	3,200
* 50	5	-----	----	----	-----	---	----	-----
0	N	-----	----	4.67	10.39	3.0	59.	3,680

Notes: Advanced timing increased by 10°

*50 mph not run because temperature reached approx. 275°C

Carburetor back to neutral settings

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                              TABLE                      VEHICLE EMISSION RESULTS
                                                      1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  200           TEST NO. 1         DATE 11/ 5/76                          MFGR. CODE   -0
VEHICLE MODEL  XL125  LEAN                 ENGINE     .13 LITRE 1                 CURB WT.      0 KG                 YR.  1976
                                                                                                                     GVW      0 KG
BAROMETER 748.28 MM OF HG.
DRY BULB TEMP.    25.0 DEG. C                                                   WET BULB TEMP  13.3 DEG. C
REL. HUMIDITY      24 PCT.                                                      ABS. HUMIDITY   4.7 GRAMS/KG
                                                                                DYNO ROLL CONSTANT   967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 304.8 MM. H2O                                       BLOWER INLET PRESS., G1 254.0 MM. H2O
    BAG RESULTS                                                                 BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                  1               2               3
    BLOWER REVOLUTIONS                    3522            6039            3520
    ROLL COUNTS                           2807            3796            2813
    HC    SAMPLE  METER READING/SCALE    30.1/3          13.7/3          14.2/3
    HC    SAMPLE  PPM                     301             137             142
    HC    BACKGRD METER READING/SCALE    1.3/3           1.8/3           1.5/3
    HC    BACKGRD PPM                      13              18              15
    CO    SAMPLE  METER READING/SCALE    43.8/3          38.5/3          38.7/3
    CO    SAMPLE  PPM                    1063             924             929
    CO    BACKGRD METER READING/SCALE     .3/3            .3/3            .3/3
    CO    BACKGRD PPM                       6               6               6
    CO2   SAMPLE  METER READING/SCALE    32.0/3          23.6/3          26.8/3
    CO2   SAMPLE  PERCENT                 .53             .38             .44
    CO2   BACKGRD METER READING/SCALE    2.7/3           3.4/3           2.2/3
    CO2   BACKGRD PERCENT                 .04             .05             .03
    NOX   SAMPLE  METER READING/SCALE    48.1/2          22.7/2          43.6/2
    NOX   SAMPLE  PPM                    48.1            22.7            43.6
    NOX   BACKGRD METER READING/SCALE     .7/2            .8/2            .7/2
    NOX   BACKGRD PPM                      .7              .8              .7
    SO2   SAMPLE  METER READING/SCALE   -0.0/*          -0.0/*          -0.0/*
    SO2   SAMPLE  PPM                     0.0             0.0             0.0
    SO2   BACKGRD METER READING/SCALE   -0.0/*          -0.0/*          -0.0/*
    SO2   BACKGRD PPM                     0.0             0.0             0.0

    HC    CONCENTRATION PPM               289             120             128
    CO    CONCENTRATION PPM              1038             904             908
    CO2   CONCENTRATION PCT               .49             .33             .41
    NOX   CONCENTRATION PPM              47.4            21.9            42.9
    SO2   CONCENTRATION PPM               0.0             0.0             0.0
    HC    MASS GRAMS                     4.18            2.97            1.85
    CO    MASS GRAMS                    30.34           45.30           26.52
    CO2   MASS GRAMS                   227.20          263.65          187.68
    NOX   MASS GRAMS                     1.90            1.51            1.72
    SO2   MASS GRAMS                     0.00            0.00            0.00
    TOTAL CARBON GRAMS                  78.64           93.95           64.19

    WEIGHTED MASS HC         .53 GRAMS/KILOMETRE
    WEIGHTED MASS CO        6.74 GRAMS/KILOMETRE
    WEIGHTED MASS CO2      42.97 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        .30 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        10.90 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  42.6  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST               236.78 GRAMS
    ESTIMATED FUEL WEIGHT =   .27KG.
    TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 200

DATE 11/ 2/76            TIME      -0 HRS.          TEST NO.  1
MODEL  1976 HONDA XL 125  FET   LEAN               ENGINE  .1 LITRE1 *
DRIVER   JB               TEST WT.      0 KG.       GVW    0 KG
WET BULB TEMP  16 C       DRY BULB TEMP  26 C       REL. HUM.  36.6 PCT
SPEC. HUM.   7.6 GRAM/KG  BARO.  746.3 MM  HG.      MEASURED FUEL  0.00 KG

  RUN DURATION        12.73 MINUTES
  BLOWER INLET PRESS.  254.0  MM. H2O
  BLOWER DIF.  PRESS.  304.8  MM  H2O
  BLOWER INLET TEMP.     43  DEG. C
  DYNO REVOLUTIONS      9959
  DISTANCE TRAVELED   16.55  KILOMETRES
  BLOWER REVOLUTIONS      5313
  BLOWER CU. CM /REV.  8012

  BAG RESULTS
   HC  SAMPLE  METER READING/SCALE                30.8/3
   HC  SAMPLE  PPM                                 308
   HC  BACKGRD METER READING/SCALE                 1.7/3
   HC  BACKGRD PPM                                  17
   CO  SAMPLE  METER READING/SCALE                72.8/3
   CO  SAMPLE  PPM                                1913
   CO  BACKGRD METER READING/SCALE                  .3/3
   CO  BACKGRD PPM                                   6
   CO2 SAMPLE  METER READING/SCALE                62.5/3
   CO2 SAMPLE  PERCENT                            1.11
   CO2 BACKGRD METER READING/SCALE                 2.8/3
   CO2 BACKGRD PERCENT                             .04
   NOX SAMPLE  METER READING/SCALE                78.2/3
   NOX SAMPLE  PPM                               234.6
   NOX BACKGRD METER READING/SCALE                  .4/3
   NOX BACKGRD PPM                                 1.2
   HC  CONCENTRATION PPM                           293
   CO  CONCENTRATION PPM                          1844
   CO2 CONCENTRATION PCT                          1.07
   NOX CONCENTRATION PPM                         233.5
   SO2 COCENTRATION PPM                            0.0
   HC  MASS (GRAMS)                               6.37
   CO  MASS (GRAMS)                              81.02
   CO2 MASS (GRAMS)                             745.61
   NOX MASS (GRAMS)                              15.28
   SO2 MASS (GRAMS)                               0.00

HC  GRAMS/KILOMETRE       .38
CO  GRAMS/KILOMETRE      4.89
CO2 GRAMS/KILOMETRE     45.04
NOX GRAMS/KILOMFTRE       .92
SO2 GRAMS/KILOMETHE      0.00

HC  GRAMS/KG OF FUEL  22.61     HC  GRAMS/MIN    .50
CO  GRAMS/KG OF FUEL  287.5     CO  GRAMS/MIN    6.4
CO2 GRAMS/KG OF FUEL   2646     CO2 GRAMS/MIN     59
NOX GRAMS/KG OF FUEL  54.22     NOX GRAMS/MIN   1.20
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                    43.16  KILOMETRES/LITRE
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                    TABLE                          VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  200       TEST NO. 1          DATE 11/ 9/76                          MFGR. CODE   -0                   YR.  1976
VEHICLE MODEL  XL 125  RICH             ENGINE    .13 LITRE 1                  CURB WT.     0 KG                 GVW     0 KG

BAROMETER 744.97 MM OF HG.
DRY BULB TEMP.    24.7 DEG. C                                         WET BULB TEMP  15.6 DEG. C
REL. HUMIDITY      29 PCT.                                            ABS. HUMIDITY   6.5 GRAMS/KG
                                                                      DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, 309.8 MM. H2O                             BLOWER INLET PRESS., G1 254.0 MM. H2O
    BAG RESULTS                                                       BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                        1              2              3
    BLOWER REVOLUTIONS                          3526           6039           3530
    ROLL COUNTS                                  2815           3719           2820
    HC    SAMPLE  METER READING/SCALE           87.1/3         10.0/4         10.1/4
    HC    SAMPLE  PPM                            871           1000           1010
    HC    BACKGRD METER READING/SCALE            2.7/3          2.1/3           .3/4
    HC    BACKGRD PPM                             27             21             30
    CO    SAMPLE  METER READING/SCALE           50.1/2         46.2/2         50.5/2
    CO    SAMPLE  PPM                           2415           2169           2441
    CO    BACKGRD METER READING/SCALE             .2/2           .3/2           .2/2
    CO    BACKGRD PPM                              8             11              8
    CO2   SAMPLE  METER READING/SCALE           21.6/3         14.9/3         19.2/3
    CO2   SAMPLE  PERCENT                        .35            .24            .31
    CO2   BACKGRD METER READING/SCALE            4.0/3          3.5/3          3.0/3
    CO2   BACKGRD PERCENT                        .06            .05            .05
    NOX   SAMPLE  METER READING/SCALE            8.9/2          4.3/2          6.9/2
    NOX   SAMPLE  PPM                            8.9            4.3            6.9
    NOX   BACKGRD METER READING/SCALE            1.6/2          1.2/2           .6/2
    NOX   BACKGRD PPM                            1.6            1.2             .6
    SO2   SAMPLE  METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
    SO2   SAMPLE  PPM                            0.0            0.0            0.0
    SO2   BACKGRD METER READING/SCALE          -0.0/*         -0.0/*         -0.0/*
    SO2   BACKGRD PPM                            0.0            0.0            0.0

    HC   CONCENTRATION PPM                       845            980            981
    CO   CONCENTRATION PPM                      2369           2128           2397
    CO2  CONCENTRATION PCT                       .29            .18            .26
    NOX  CONCENTRATION PPM                       7.4            3.1            6.3
    SO2  CONCENTRATION PPM                       0.0            0.0            0.0
    HC   MASS GRAMS                            12.18          24.18          14.16
    CO   MASS GRAMS                            68.91         106.01          69.80
    CO2  MASS GRAMS                           133.50         145.36         121.61
    NOX  MASS GRAMS                              .31            .23            .27
    SO2  MASS GRAMS                             0.00           0.00           0.00
    TOTAL CARBON GRAMS                         76.53         106.06          75.37

    WEIGHTED MASS HC        3.45 GRAMS/KILOMETRE
    WEIGHTED MASS CO       16.15 GRAMS/KILOMETRE
    WEIGHTED MASS CO2      25.04 GRAMS/KILOMETRE
    WEIGHTED MASS NOX        .05 GRAMS/KILOMETRE
    WEIGHTED MASS SO2       0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE        10.87 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  38.6  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              257.96 GRAMS
    ESTIMATED FUEL WEIGHT =    .30KG.
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      TABLE          EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                               VEHICLE NUMBER 200

  DATE 11/ 3/76                      TIME     -0 HRS.           TEST NO.  1
  MODEL  1976 HONDA XL-175     FET RICH                         ENGINE  .1 LITRE  1
  DRIVER   JR                        TEST WT.      0 KG.        GVW     0 KG
  WET BULB TEMP  16 C                DRY BULB TEMP  25 C        REL. HUM.  39.0 PCT
  SPEC. HUM.    7.8 GRAM/KG          BARO.  747.8 MM  HG.       MEASURED FUEL  0.00 KG

    RUN DURATION            12.77 MINUTES
    BLOWER INLET PRESS.  254.0  MM. H20
    BLOWER DIF.  PRESS.  304.8  MM  H20
    BLOWER INLET TEMP.      43  DEG. C
    DYNO REVOLUTIONS      9969
    DISTANCE TRAVELED   16.57  KILOMETRES
    BLOWER REVOLUTIONS      5330
    BLOWER CU. CM /REV.  8014

    BAG RESULTS
     HC   SAMPLE  METER READING/SCALE              46.6/3
     HC   SAMPLE  PPM                                466
     HC   BACKGRD METER READING/SCALE                2.2/3
     HC   BACKGRD PPM                                  22
     CO   SAMPLE  METER READING/SCALE              84.7/2
     CO   SAMPLE  PPM                               5165
     CO   BACKGRD METER READING/SCALE                .4/2
     CO   BACKGRD PPM                                  15
     CO2 SAMPLE  METER READING/SCALE               59.0/3
     CO2 SAMPLE  PERCENT                            1.04
     CO2 BACKGRD METER READING/SCALE                3.8/3
     CO2 BACKGRD PERCENT                              .06
     NOX SAMPLE  METER READING/SCALE              50.6/3
     NOX SAMPLE  PPM                              151.8
     NOX BACKGRD METER READING/SCALE                 .6/3
     NOX BACKGRD PPM                                  1.8
     HC   CONCENTRATION PPM                          447
     CO   CONCENTRATION PPM                         4983
     CO2 CONCENTRATION PCT                           .99
     NOX CONCENTRATION PPM                        150.2
     SO2 COCENTRATION PPM                           0.0
     HC   MASS (GRAMS)                               9.78
     CO   MASS (GRAMS)                            220.23
     CO2 MASS (GRAMS)                             692.19
     NOX MASS (GRAMS)                               9.95
     SO2 MASS (GRAMS)                               0.00

  HC   GRAMS/KILOMETRE         .59
  CO   GRAMS/KILOMETRE       13.29
  CO2 GRAMS/KILOMETRE        41.77
  NOX GRAMS/KILOMETRE          .60
  SO2 GRAMS/KILOMETRE         0.00

  HC   GRAMS/KG OF FUEL   28.98      HC   GRAMS/MIN      .77
  CO   GRAMS/KG OF FUEL  652.8       CO   GRAMS/MIN    17.2
  CO2 GRAMS/KG OF FUEL   2052        CO2 GRAMS/MIN      54
  NOX GRAMS/KG OF FUEL   29.19       NOX GRAMS/MIN      .78
  SO2 GRAMS/KG OF FUEL    0.00       SO2 GRAMS/MIN    0.00
  CARBON BALANCE FUEL ECONOMY
                                                  36.08  KILOMETRES/LITRE
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                TABLE                          VEHICLE EMISSION RESULTS
                                        1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  200        TEST NO. 1        DATE 11/23/76                     MFGR. CODE    -0                    YR.  1976
VEHICLE MODEL  XL 125 ADVANCE10        ENGINE     .13 LITRE 1             CURB WT.       0 KG                GVW      0 KG

BAROMETER 748.59 MM OF HG.                                               WET BULB TEMP  14.9 DEG. C
DRY BULB TEMP.    24.9 DEG. C                                            ABS. HUMIDITY    6.1 GRAMS/KG
REL. HUMIDITY     32 PCT.                                                DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS

   BLOWER DIF. PRESS., G2, 274.4 MM. H2O                                 BLOWER INLET PRESS., G1 254.0 MM. H2O
   BAG RESULTS                                                           BLOWER INLET TEMP.    43 DEG. C
   BAG NO.                                         1               2               3
   BLOWER REVOLUTIONS                            3523            6092            3519
   ROLL COUNTS                                    2797            3771            2821
   HC   SAMPLE  METER READING/SCALE              52.1/3          23.2/3          23.2/3
   HC   SAMPLE  PPM                               521             232             232
   HC   BACKGRD METER READING/SCALE               2.0/3           3.4/3           2.3/3
   HC   BACKGRD PPM                                20              34              23
   CO   SAMPLE  METER READING/SCALE              82.9/3          83.5/3          91.0/3
   CO   SAMPLE  PPM                              2277            2301            2620
   CO   BACKGRD METER READING/SCALE               1.0/3           1.1/3           1.6/3
   CO   BACKGRD PPM                                22              29              35
   CO2  SAMPLE  METER READING/SCALE              26.4/3          18.9/3          23.7/3
   CO2  SAMPLE  PERCENT                            .43             .29             .39
   CO2  BACKGRD METER READING/SCALE               4.2/3           4.6/3           5.1/3
   CO2  BACKGRD PERCENT                            .06             .07             .08
   NOX  SAMPLE  METER READING/SCALE              24.2/2           7.9/2          18.4/2
   NOX  SAMPLE  PPM                               24.2             7.9            18.4
   NOX  BACKGRD METER READING/SCALE                .7/2            .8/2            .8/2
   NOX  BACKGRD PPM                                 .7              .8              .8
   SO2  SAMPLE  METER READING/SCALE              -0.0/*          -0.0/*          -0.0/*
   SO2  SAMPLE  PPM                               0.0             0.0             0.0
   SO2  BACKGRD METER READING/SCALE              -0.0/*          -0.0/*          -0.0/*
   SO2  BACKGRD PPM                               0.0             0.0             0.0

   HC   CONCENTRATION PPM                         502             199             210
   CO   CONCENTRATION PPM                        2215            2292            2591
   CO2  CONCENTRATION PCT                         .37             .23             .31
   NOX  CONCENTRATION PPM                        23.5             7.1            17.6
   SO2  CONCENTRATION PPM                         0.0             0.0             0.0
   HC   MASS GRAMS                               7.67            5.23            3.21
   CO   MASS GRAMS                              68.39          118.62           78.33
   CO2  MASS GRAMS                             180.77          189.48          151.11
   NOX  MASS GRAMS                               1.04             .54             .78
   SO2  MASS GRAMS                               0.00            0.00            0.00
   TOTAL CARBON GRAMS                           85.28          107.10           77.60

   WEIGHTED MASS HC        .95 GRAMS/KILOMETRE
   WEIGHTED MASS CO      17.61 GRAMS/KILOMETRE
   WEIGHTED MASS CO2     32.30 GRAMS/KILOMETRE
   WEIGHTED MASS NOX       .13 GRAMS/KILOMETRE
   WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

   ACTUAL DISTANCE       10.99 KILOMETRE

   FUEL ECONOMY BY CARBON BALANCE =  37.6  KILOMETRE/LITRE
   TOTAL CARBON EXHAUST                269.99 GRAMS
   ESTIMATED FUEL WEIGHT =   .31KG.
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TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                        VEHICLE NUMBER 200

DATE 11/23/76               TIME    -0 HRS.          TEST NO.  1
MODEL  1976 HONDA XL125     FET  ADVANCE 10          ENGINE  .1 LITRE  1
DRIVER   TJ                 TEST WT.      0 KG.      GVW     0 KG
WET BULB TEMP  14 C         DRY BULB TEMP  26 C      REL. HUM.  27.5 PCT
SPEC. HUM.   5.7 GRAM/KG    BARO.  748.3 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION          12.76 MINUTES
  BLOWER INLET PRESS.  254.0  MM. H2O
  BLOWER DIF.  PRESS.  304.8  MM  H2O
  BLOWER INLET TEMP.     43  DEG. C
  DYNO REVOLUTIONS     4719
  DISTANCE TRAVELED   16.16  KILOMETRES
  BLOWER REVOLUTIONS     5324
  BLOWER CU. CM /REV.  8366

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE                36.5/3
   HC   SAMPLE  PPM                                 365
   HC   BACKGRD METER READING/SCALE                 2.4/3
   HC   BACKGRD PPM                                 24
   CO   SAMPLE  METER READING/SCALE                73.5/2
   CO   SAMPLE  PPM                                4177
   CO   BACKGRD METER READING/SCALE                  .8/2
   CO   BACKGRD PPM                                 30
   CO2 SAMPLE  METER READING/SCALE                 62.6/3
   CO2 SAMPLE  PERCENT                             1.11
   CO2 BACKGRD METER READING/SCALE                  4.3/3
   CO2 BACKGRD PERCENT                              .07
   NOX SAMPLE  METER READING/SCALE                 69.5/3
   NOX SAMPLE  PPM                                208.5
   NOX BACKGRD METER READING/SCALE                  .7/3
   NOX BACKGRD PPM                                 2.1
   HC   CONCENTRATION PPM                          344
   CO   CONCENTRATION PPM                         4024
   CO2 CONCENTRATION PCT                          1.06
   NOX CONCENTRATION PPM                         206.6
   SO2 COCENTRATION PPM                           0.0
   HC   MASS (GRAMS)                              7.85
   CO   MASS (GRAMS)                            185.57
   CO2 MASS (GRAMS)                             769.45
   NOX MASS (GRAMS)                              13.42
   SO2 MASS (GRAMS)                               0.00

HC   GRAMS/KILOMETRE        .49
CO   GRAMS/KILOMETRE      11.49
CO2 GRAMS/KILOMETRE      47.63
NOX GRAMS/KILOMETRE        .83
SO2 GRAMS/KILOMETRE       0.00

HC   GRAMS/KG OF FUEL  22.92      HC   GRAMS/MIN    .62
CO   GRAMS/KG OF FUEL  541.6      CO   GRAMS/MIN   14.5
CO2 GRAMS/KG OF FUEL   2246      CO2 GRAMS/MIN     60
NOX GRAMS/KG OF FUEL  39.19      NOX GRAMS/MIN   1.05
SO2 GRAMS/KG OF FUEL   0.00      SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                     34.64  KILOMETRES/LITRE
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STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KZ 900

Date 12/07/76 Sequence Baseline

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1000	0	1.68	6.33	10.0	25.	9,760
20	2	2400	.49	5.68	8.06	4.6	67.	7,760
30	3	2800	1.08	5.56	8.75	3.5	129.	4,670
40	4	3050	2.05	4.94	9.98	3.5	345.	3,680
50	5	3400	3.30	4.91	10.60	2.8	350.	3.980
60	5	4050	4.74	4.67	10.99	2.3	790.	3.070
0	N	1000	0	2.21	6.25	9.2	29.	9,680

Notes: Vacuum set: Outside 9.7 in. Hg
Inside 9.0 in. Hg

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KZ-900

Date 12/03/76 Sequence Lean Adjustment

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1000	----	0.50	6.01	9.0	32.	13,500
20	2	2400	0.48	2.83	9.49	4.3	105.	4,240
30	3	2800	1.12	2.71	10.12	4.3	180.	2,880
40	4	3100	2.16	1.81	11.22	3.9	445.	2.120
50	5	3400	3.43	1.15	10.44	3.7	1100.	2,000
60	5	4050	4.92	0.65	12.38	3.1	1480.	1,280
0	N	1000	----	0.53	6.01	9.6	35.	11,900

Notes: Idle air screw: out 1/2 turn
Clip moved up 1 notch
Idle screw adjusted as needed for 1000 rpm
Vacuum set same as baseline

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KZ 900

Date 12/04/76 Sequence Rich Adjustment

Condition				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1000	---	3.12	5.00	8.6	15.	15,100
20	2	2400	0.49	8.01	5.93	4.1	32.	29,400
30	3	2800	1.10	8.66	6.81	3.8	54.	15,100
40	4	3050	2.07	9.37	7.10	3.3	85.	9,440
50	5	3400	3.35	9.25	7.74	2.5	200.	6,560
60	5	4000	4.81	10.92	7.34	1.8	95.	6,000
0	N	1000	----	3.48	4.78	8.0	17.	17,400

Notes: Idle air screw: in 1/2 turn
Clip moved down 1 notch
Idle screw adjusted as needed for 1000 rpm
Vacuum set same as baseline

STEADY-STATE EMISSIONS CONCENTRATIONS
MOTORCYCLE Kawasaki KZ 900

Date 12/06/76 Sequence Advanced Timing Adjustment

Conditon				Concentrations				
Speed, mi/hr	Gear	Engine rpm	Load	CO, %	CO_2, %	O_2, %	NO, ppm	FID HC, ppm C
0	N	1000	----	1.78	6.17	9.4	25.	15,000
20	2	2450	0.51	5.26	7.92	5.1	71.	15,400
30	3	2800	1.14	5.40	8.91	3.8	145.	6,800
40	4	3050	2.11	5.10	9.91	2.6	305.	3,760
50	5	3400	3.44	4.17	11.03	3.1	1140.	3,520
60	5	4000	5.00	4.33	11.22	2.5	1130.	2,720
0	N	1000	----	2.41	5.85	10.3	29.	14,700

Notes: Advance approx. 7° from recommended timing

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                        TABLE                    VEHICLE EMISSION RESULTS
                                            1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800        TEST NO. 2         DATE 12/ 4/76                MFGR. CODE   -0               YR.  1976
VEHICLE MODEL  KZ 900  LEAN             ENGINE     .90 LITRE 4       CURB WT.      0 KG            GVW      0 KG

BAROMETER 745.49 MM OF HG.                                          WET BULB TEMP  12.8 DEG. C
DRY BULB TEMP.    24.4 DEG. C                                       ABS. HUMIDITY   4.4 GRAMS/KG
REL. HUMIDITY      23 PCT.                                          DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                    BLOWER INLET PRESS., G1 *22.1 MM. H2O
     BLOWER DIF. PRESS., G2, *79.6 MM. H2O                          BLOWER INLET TEMP.   41 DEG. C
     BAG RESULTS
     BAG NO.                                    1              2              3
     BLOWER REVOLUTIONS                     10353          17799          10360
     ROLL COUNTS                             3476           3750           3485
     HC    SAMPLE  METER READING/SCALE     87.5/3         22.1/3         25.0/3
     HC    SAMPLE  PPM                       875            221            250
     HC    BACKGRD METER READING/SCALE      3.1/3          3.5/3          2.3/3
     HC    BACKGRD PPM                        31             35             23
     CO    SAMPLE  METER READING/SCALE     39.2/3         34.8/3         33.2/3
     CO    SAMPLE  PPM                       942            828            788
     CO    BACKGRD METER READING/SCALE       .4/3           .6/3           .5/3
     CO    BACKGRD PPM                         9             13             11
     CO2   SAMPLE  METER READING/SCALE     36.2/3         21.8/3         28.5/3
     CO2   SAMPLE  PERCENT                   .61            .35            .47
     CO2   BACKGRD METER READING/SCALE      3.7/3          4.0/3          3.8/3
     CO2   BACKGRD PERCENT                   .06            .06            .06
     NOX   SAMPLE  METER READING/SCALE     30.7/2          6.3/2         25.2/2
     NOX   SAMPLE  PPM                      30.7            6.3           25.2
     NOX   BACKGRD METER READING/SCALE      1.0/2           .7/2           .5/2
     NOX   BACKGRD PPM                       1.0             .7             .5
     SO2   SAMPLE  METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
     SO2   SAMPLE  PPM                       0.0            0.0            0.0
     SO2   BACKGRD METER READING/SCALE     -0.0/*         -0.0/*         -0.0/*
     SO2   BACKGRD PPM                       0.0            0.0            0.0

     HC    CONCENTRATION PPM                 846            187            228
     CO    CONCENTRATION PPM                 916            804            764
     CO2   CONCENTRATION PCT                 .55            .29            .41
     NOX   CONCENTRATION PPM                29.8            5.6           24.7
     SO2   CONCENTRATION PPM                 0.0            0.0            0.0
     HC    MASS GRAMS                      30.48          11.60           8.22
     CO    MASS GRAMS                      66.65         100.59          55.64
     CO2   MASS GRAMS                     636.76         578.77         474.99
     NOX   MASS GRAMS                       2.94            .96           2.45
     SO2   MASS GRAMS                       0.00           0.00           0.00
     TOTAL CARBON GRAMS                   228.75         211.13         160.61

     WEIGHTED MASS HC       2.44 GRAMS/KILOMETRE
     WEIGHTED MASS CO      13.39 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     93.46 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .30 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE       12.02 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  19.3  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST               600.48 GRAMS
     ESTIMATED FUEL WEIGHT =    .69KG.
     TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                          VEHICLE NUMBER 800

DATE 12/ 4/76              TIME    -0 HRS.         TEST NO.  2
MODEL  1976 KAWASAKI KZ900 FET  LEAN               ENGINE  .9 LITRE  4
DRIVER   JB                TEST WT.     0 KG.      GVW    0 KG
WET BULB TEMP  13 C        DRY BULB TEMP  24 C     REL. HUM.  25.8 PCT
SPFC. HUM.   5.0 GRAM/KG   BARO.  745.7 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION           12.76 MINUTES
  BLOWER INLET PRESS. 1722.1  MM. H20
  BLOWER DIF.  PRESS. 1879.6  MM  H20
  BLOWER INLET TEMP.      42  DEG. C
  DYNO REVOLUTIONS      9974
  DISTANCE TRAVELED   16.58  KILOMETRES
  BLOWER REVOLUTIONS    15671
  BLOWER CU. CM /REV.  7939

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE           17.9/3
   HC   SAMPLE  PPM                           179
   HC   BACKGRD METER READING/SCALE           1.9/3
   HC   BACKGRD PPM                            19
   CO   SAMPLE  METER READING/SCALE           35.6/3
   CO   SAMPLE  PPM                           849
   CO   BACKGRD METER READING/SCALE             .2/3
   CO   BACKGRD PPM                              4
   CO2 SAMPLE  METER READING/SCALE            46.8/3
   CO2 SAMPLE  PERCENT                          .81
   CO2 BACKGRD METER READING/SCALE             3.7/3
   CO2 BACKGRD PERCENT                          .06
   NOX SAMPLE  METER READING/SCALE            61.8/2
   NOX SAMPLE  PPM                            61.8
   NOX BACKGRD METER READING/SCALE              .6/2
   NOX BACKGRD PPM                              .6
   HC  CONCENTRATION PPM                      161
   CO  CONCENTRATION PPM                      825
   CO2 CONCENTRATION PCT                       .75
   NOX CONCENTRATION PPM                      61.2
   SO2 COCENTRATION PPM                       0.0
   HC  MASS (GRAMS)                           8.76
   CO  MASS (GRAMS)                          90.46
   CO2 MASS (GRAMS)                        1304.15
   NOX MASS (GRAMS)                           9.28
   SO2 MASS (GRAMS)                           0.00

 HC  GRAMS/KILOMETRE       .53
 CO  GRAMS/KILOMETRE      5.46
 CO2 GRAMS/KILOMETRE     78.66
 NOX GRAMS/KILOMETRE       .56
 SO2 GRAMS/KILOMETRE      0.00

 HC  GRAMS/KG OF FUEL  18.84    HC  GRAMS/MIN    .69
 CO  GRAMS/KG OF FUEL  194.5    CO  GRAMS/MIN    7.1
 CO2 GRAMS/KG OF FUEL   2804    CO2 GRAMS/MIN    102
 NOX GRAMS/KG OF FUEL  19.95    NOX GRAMS/MIN    .73
 SO2 GRAMS/KG OF FUEL   0.00    SO2 GRAMS/MIN   0.00
 CARBON BALANCE FUEL ECONOMY                   26.19  KILOMETRES/LITRE
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                    TABLE                          VEHICLE EMISSION RESULTS
                                              1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800        TEST NO. 3          DATE 12/ 6/76                   MFGR. CODE    -0                   YR.  1976
VEHICLE MODEL  KZ 900  RICH              ENGINE     .90 LITRE 4          CURB WT.      0 KG                 GVW      0 KG

BAROMETER 742.19 MM OF HG.                                         WET BULB TEMP  18.3 DEG. C
DRY BULB TEMP.   26.1 DEG. C                                       ABS. HUMIDITY  10.1 GRAMS/KG
REL. HUMIDITY     47 PCT.                                          DYNO ROLL CONSTANT   467.97

EXHAUST EMISSIONS

     BLOWER DIF. PRESS., G2, *77.1 MM. H2O                         BLOWER INLET PRESS., G1 *01.8 MM. H2O
     BAG RESULTS                                                   BLOWER INLET TEMP.   43 DEG. C
     BAG NO.                                   1              2              3
     BLOWER REVOLUTIONS                      10322          17791          10355
     ROLL COUNTS                              3515           3781           3488
     HC    SAMPLE  METER READING/SCALE       87.0/3         74.9/3         68.1/3
     HC    SAMPLE  PPM                        870            749            681
     HC    BACKGRD METER READING/SCALE        2.9/3          3.6/3          4.1/3
     HC    BACKGRD PPM                        29             36             41
     CO    SAMPLE  METER READING/SCALE       69.0/2         57.1/2         72.7/2
     CO    SAMPLE  PPM                       3802           2891           4109
     CO    BACKGRD METER READING/SCALE        .5/2           .8/2           .4/2
     CO    BACKGRD PPM                        19             30             34
     CO2   SAMPLE  METER READING/SCALE       25.6/3         16.3/3         20.6/3
     CO2   SAMPLE  PERCENT                    .42            .26            .33
     CO2   BACKGRD METER READING/SCALE        3.6/3          3.8/3          4.3/3
     CO2   BACKGRD PERCENT                    .06            .06            .07
     NOX   SAMPLE  METER READING/SCALE        6.3/2          2.2/2          4.0/2
     NOX   SAMPLE  PPM                        6.3            2.2            4.0
     NOX   BACKGRD METER READING/SCALE        .5/2           .4/2           .4/2
     NOX   BACKGRD PPM                        .5             .4             .4
     SO2   SAMPLE  METER READING/SCALE      -0.0/*         -0.0/*         -0.0/*
     SO2   SAMPLE  PPM                        0.0            0.0            0.0
     SO2   BACKGRD METER READING/SCALE      -0.0/*         -0.0/*         -0.0/*
     SO2   BACKGRD PPM                        0.0            0.0            0.0

     HC    CONCENTRATION PPM                  843            715            642
     CO    CONCENTRATION PPM                 3696           2804           3989
     CO2   CONCENTRATION PCT                  .37            .20            .27
     NOX   CONCENTRATION PPM                  5.8            1.8            3.6
     SO2   CONCENTRATION PPM                  0.0            0.0            0.0
     HC    MASS GRAMS                        29.87          43.63          22.84
     CO    MASS GRAMS                       264.42         345.68         286.36
     CO2   MASS GRAMS                       414.08         396.78         305.80
     NOX   MASS GRAMS                         .67            .36            .42
     SO2   MASS GRAMS                        0.00           0.00           0.00
     TOTAL CARBON GRAMS                     252.25         294.29         226.02

     WEIGHTED MASS HC       5.74 GRAMS/KILOMETRE
     WEIGHTED MASS CO      51.45 GRAMS/KILOMETRE
     WEIGHTED MASS CO2     61.90 GRAMS/KILOMETRE
     WEIGHTED MASS NOX       .07 GRAMS/KILOMETRE
     WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

     ACTUAL DISTANCE        12.10 KILOMETRE

     FUEL ECONOMY BY CARBON BALANCE =  14.7  KILOMETRE/LITRE
     TOTAL CARBON EXHAUST              772.57 GRAMS
     FSTIMATED FUEL WEIGHT =   .89KG.
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       TABLE         EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                              VEHICLE NUMBER 800

DATE 12/ 6/76              TIME     -0 HRS.        TEST NO.  3
MODEL  1976 KAWASAKI KZ900 FET  RICH               ENGINE  .9 LITRE  4
DRIVER   JR                TEST WT.      0 KG.     GVW    0 KG
WET BULB TEMP  18 C        DRY BULB TEMP  27 C     REL. HUM.  41.3 PCT
SPEC. HUM.    9.2 GRAM/KG  BARO.  742.2 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION          12.76 MINUTES
  BLOWER INLET PRESS. 1689.1  MM. H2O
  BLOWER DIF.  PRESS. 1828.8  MM  H2O
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS     10041
  DISTANCE TRAVELED    16.69  KILOMETRES
  BLOWER REVOLUTIONS    15668
  BLOWER CU. CM /REV.  7940

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE           60.0/3
   HC   SAMPLE  PPM                            600
   HC   BACKGRD METER READING/SCALE            2.1/3
   HC   BACKGRD PPM                             21
   CO   SAMPLE  METER READING/SCALE           69.5/1
   CO   SAMPLE  PPM                           7393
   CO   BACKGRD METER READING/SCALE             .6/1
   CO   BACKGRD PPM                             32
   CO2 SAMPLE  METER READING/SCALE            31.2/3
   CO2 SAMPLE  PERCENT                          .52
   CO2 BACKGRD METER READING/SCALE             3.0/3
   CO2 BACKGRD PERCENT                          .05
   NOX SAMPLE  METER READING/SCALE             7.6/2
   NOX SAMPLE  PPM                             7.6
   NOX BACKGRD METER READING/SCALE              .4/2
   NOX BACKGRD PPM                              .4
   HC   CONCENTRATION PPM                      581
   CO   CONCENTRATION PPM                     7192
   CO2 CONCENTRATION PCT                        .48
   NOX CONCENTRATION PPM                       7.2
   SO2 COCENTRATION PPM                        0.0
   HC   MASS (GRAMS)                          31.40
   CO   MASS (GRAMS)                         784.69
   CO2 MASS (GRAMS)                          819.53
   NOX MASS (GRAMS)                            1.24
   SO2 MASS (GRAMS)                            0.00

HC  GRAMS/KILOMETRE      1.88
CO  GRAMS/KILOMETRF     47.01
CO2 GRAMS/KILOMETRE     49.10
NOX GRAMS/KILOMETRE       .07
SO2 GRAMS/KILOMETRE      0.00

HC  GRAMS/KG OF FUEL  46.24     HC  GRAMS/MIN   2.46
CO  GRAMS/KG OF FUEL  *55.7     CO  GRAMS/MIN   61.5
CO2 GRAMS/KG OF FUEL   1207     CO2 GRAMS/MIN     64
NOX GRAMS/KG OF FUEL   1.82     NOX GRAMS/MIN    .10
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                    18.06  KILOMETRES/LITRE
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                                 TABLE                    VEHICLE EMISSION RESULTS
                                                       1975 LIGHT DUTY EMISSIONS TEST
UNIT NO.  800         TEST NO. 4             DATE 12/ 7/76
VEHICLE MODEL  KZ 900 ADVANCED7              ENGINE     .90 LITRE 4           MFGR. CODE    -0                  YR.  1976
                                                                            CURB WT.      0 KG                GVM      0 KG
BAROMETER 746.51 MM OF HG.
DRY BULB TEMP.    26.1 DEG. C                                             WET BULB TEMP  11.7 DEG. C
REL. HUMIDITY      12 PCT.                                                ABS. HUMIDITY   2.6 GRAMS/KG
                                                                          DYNO ROLL CONSTANT    967.97
EXHAUST EMISSIONS

    BLOWER DIF. PRESS., G2, *79.6 MM. H2O                                 BLOWER INLET PRESS., G1 *27.2 MM. H2O
    BAG RESULTS                                                           BLOWER INLET TEMP.    43 DEG. C
    BAG NO.                                      1             2             3
    BLOWER REVOLUTIONS                       10389         17807         10356
    ROLL COUNTS                               3490          3762          3491
    HC    SAMPLE  METER READING/SCALE       94.2/3        32.4/3        30.6/3
    HC    SAMPLE  PPM                          942           324           306
    HC    BACKGRD METER READING/SCALE        2.2/3         2.7/3         2.6/3
    HC    BACKGRD PPM                           22            27            26
    CO    SAMPLE  METER READING/SCALE       67.8/3        62.7/3        69.0/3
    CO    SAMPLE  PPM                         1751          1594          1789
    CO    BACKGRD METER READING/SCALE         .7/3          .7/3          .3/3
    CO    BACKGRD PPM                           15            15             6
    CO2   SAMPLE  METER READING/SCALE       29.5/3        18.4/3        24.4/3
    CO2   SAMPLE  PERCENT                      .49           .29           .40
    CO2   BACKGRD METER READING/SCALE        3.0/3         3.4/3         3.4/3
    CO2   BACKGRD PERCENT                      .05           .05           .05
    NOX   SAMPLE  METER READING/SCALE       27.4/2         5.1/2        19.7/2
    NOX   SAMPLE  PPM                         27.4           5.1          19.7
    NOX   BACKGRD METER READING/SCALE         .6/2          .7/2          .7/2
    NOX   BACKGRD PPM                           .6            .7            .7
    SO2   SAMPLE  METER READING/SCALE      -0.0/*        -0.0/*        -0.0/*
    SO2   SAMPLE  PPM                          0.0           0.0           0.0
    SO2   BACKGRD METER READING/SCALE      -0.0/*        -0.0/*        -0.0/*
    SO2   BACKGRD PPM                          0.0           0.0           0.0

    HC    CONCENTRATION PPM                    921           298           281
    CO    CONCENTRATION PPM                   1713          1564          1762
    CO2   CONCENTRATION PCT                    .44           .24           .35
    NOX   CONCENTRATION PPM                   26.8           4.4          19.0
    SO2   CONCENTRATION PPM                    0.0           0.0           0.0
    HC    MASS GRAMS                         33.01         18.30         10.04
    CO    MASS GRAMS                        123.93        193.93        127.04
    CO2   MASS GRAMS                        506.63        478.56        395.64
    NOX   MASS GRAMS                          2.51           .71          1.78
    SO2   MASS GRAMS                          0.00          0.00          0.00
    TOTAL CARBON GRAMS                      219.99        229.61        171.15

    WEIGHTED MASS HC       3.17 GRAMS/KILOMETRE
    WEIGHTED MASS CO      26.51 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     76.47 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .23 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.06 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  18.4  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST              620.74 GRAMS
    ESTIMATED FUEL WEIGHT =   .72KG.
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      TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                           VEHICLE NUMBER 800

DATE 12/ 7/76                TIME    -0 HRS.         TEST NO.  4
MODEL  1976 KAWASAKI KZ900 FET ADVANCE 07             ENGINE  .9 LITRE  4
DRIVER   JB                  TEST WT.     0 KG.      GVW    0 KG
WET BULB TEMP  11 C          DRY BULB TEMP  25 C     REL. HUM.  12.6 PCT
SPEC. HUM.   2.5 GRAM/KG     BARO.  746.5 MM  HG.    MEASURED FUEL  0.00 KG

  RUN DURATION          12.76 MINUTES
  BLOWER INLET PRESS. 1689.1  MM. H2O
  BLOWER DIF.  PRESS. 1879.6  MM  H2O
  BLOWER INLET TEMP.     43  DEG. C
  DYNO REVOLUTIONS      9966
  DISTANCE TRAVELED   16.57  KILOMETRES
  BLOWER REVOLUTIONS    15679
  BLOWER CU. CM /REV.  7923

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE             26.7/3
   HC   SAMPLE  PPM                              267
   HC   BACKGRD METER READING/SCALE              2.2/3
   HC   BACKGRD PPM                               22
   CO   SAMPLE  METER READING/SCALE             96.2/3
   CO   SAMPLE  PPM                             2875
   CO   BACKGRD METER READING/SCALE               .7/3
   CO   BACKGRD PPM                               15
   CO2 SAMPLE  METER READING/SCALE              38.8/3
   CO2 SAMPLE  PERCENT                           .66
   CO2 BACKGRD METER READING/SCALE               3.1/3
   CO2 BACKGRD PERCENT                           .05
   NOX SAMPLE  METER READING/SCALE              51.8/2
   NOX SAMPLE  PPM                              51.8
   NOX BACKGRD METER READING/SCALE               1.0/2
   NOX BACKGRD PPM                               1.0
   HC  CONCENTRATION PPM                         247
   CO  CONCENTRATION PPM                        2813
   CO2 CONCENTRATION PCT                          .61
   NOX CONCENTRATION PPM                        50.9
   SO2 COCENTRATION PPM                          0.0
   HC  MASS (GRAMS)                            13.40
   CO  MASS (GRAMS)                           308.58
   CO2 MASS (GRAMS)                          1059.40
   NOX MASS (GRAMS)                             7.22
   SO2 MASS (GRAMS)                             0.00

HC  GRAMS/KILOMETRE       .81
CO  GRAMS/KILOMETRE     18.63
CO2 GRAMS/KILOMETRE     63.95
NOX GRAMS/KILOMETRE       .44
SO2 GRAMS/KILOMETRE      0.00

HC  GRAMS/KG OF FUEL  26.76     HC  GRAMS/MIN   1.05
CO  GRAMS/KG OF FUEL  616.4     CO  GRAMS/MIN   24.2
CO2 GRAMS/KG OF FUEL   2116     CO2 GRAMS/MIN     83
NOX GRAMS/KG OF FUEL  14.41     NOX GRAMS/MIN    .57
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                   24.31  KILOMETRES/LITRE
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                   TABLE                         VEHICLE EMISSION RESULTS
                                             1975  LIGHT DUTY EMISSIONS TEST
UNIT NO.  800        TEST NO. 1          DATE 12/ 3/76                     MFGR. CODE    -0                YR.  1976
VEHICLE MODEL  KZ 900  BASE, 2nd         ENGINE     .90 LITRE 4            CURB WT.      0 KG              GVW      0 KG

BAROMETER 748.79 MM OF HG.                                                 WET BULB TEMP  12.2 DEG. C
DRY BULB TEMP.    25.0 DEG. C                                              ABS. HUMIDITY   3.6 GRAMS/KG
REL. HUMIDITY      18 PCT.                                                 DYNO ROLL CONSTANT   967.97

EXHAUST EMISSIONS
                                                                           BLOWER INLET PRESS., G1 *89.1 MM. H2O
    BLOWER DIF. PRESS., G2, *41.5 MM. H2O                                  BLOWER INLET TEMP.   43 DEG. C
    BAG RESULTS
    BAG NO.                                          1              2              3
    BLOWER REVOLUTIONS                             10366          17800          10349
    ROLL COUNTS                                     3990           3784           3495
    HC    SAMPLE  METER READING/SCALE             70.9/3         27.4/3         30.9/3
    HC    SAMPLE  PPM                              709            274            309
    HC    BACKGRD METER READING/SCALE              1.7/3          1.8/3          2.0/3
    HC    BACKGRD PPM                               17             18             20
    CO    SAMPLE  METER READING/SCALE             61.8/3         70.1/3         78.5/3
    CO    SAMPLE  PPM                             1567           1824           2112
    CO    BACKGRD METER READING/SCALE               .2/3           .7/3           .6/3
    CO    BACKGRD PPM                                4             15             13
    CO2   SAMPLE  METER READING/SCALE             29.7/3         18.5/3         24.9/3
    CO2   SAMPLE  PERCENT                          .49            .30            .41
    CO2   BACKGRD METER READING/SCALE              3.3/3          3.4/3          3.0/3
    CO2   BACKGRD PERCENT                          .05            .05            .05
    NOX   SAMPLE  METER READING/SCALE             19.6/2          4.1/2         15.0/2
    NOX   SAMPLE  PPM                             19.6            4.1           15.0
    NOX   BACKGRD METER READING/SCALE               .3/2           .2/2           .3/2
    NOX   BACKGRD PPM                               .3             .2             .3
    SO2   SAMPLE  METER READING/SCALE             -0.0/*         -0.0/*         -0.0/*
    SO2   SAMPLE  PPM                              0.0            0.0            0.0
    SO2   BACKGRD METER READING/SCALE             -0.0/*         -0.0/*         -0.0/*
    SO2   BACKGRD PPM                              0.0            0.0            0.0

    HC    CONCENTRATION PPM                        693            257            290
    CO    CONCENTRATION PPM                       1539           1789           2071
    CO2   CONCENTRATION PCT                        .44            .25            .36
    NOX   CONCENTRATION PPM                       14.3            3.9           14.7
    SO2   CONCENTRATION PPM                        0.0            0.0            0.0
    HC    MASS GRAMS                             25.05          15.93          10.46
    CO    MASS GRAMS                            112.33         224.19         150.87
    CO2   MASS GRAMS                            510.08         487.23         416.76
    NOX   MASS GRAMS                              1.87            .65           1.43
    SO2   MASS GRAMS                              0.00           0.00           0.00
    TOTAL CARBON GRAMS                          209.06         242.90         187.49

    WEIGHTED MASS HC       2.70 GRAMS/KILOMETRE
    WEIGHTED MASS CO      29.64 GRAMS/KILOMETRE
    WEIGHTED MASS CO2     78.05 GRAMS/KILOMETRE
    WEIGHTED MASS NOX       .19 GRAMS/KILOMETRE
    WEIGHTED MASS SO2      0.00 GRAMS/KILOMETRE

    ACTUAL DISTANCE       12.10 KILOMETRE

    FUEL ECONOMY BY CARBON BALANCE =  17.7  KILOMETRE/LITRE
    TOTAL CARBON EXHAUST                 634.46 GRAMS
    ESTIMATED FUEL WEIGHT =   .74KG.
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        TABLE        EXHAUST EMISSIONS FROM SINGLE BAG SAMPLE
                            VEHICLE NUMBER 800

DATE 12/ 3/76                TIME    -0 HRS.          TEST NO.  1
MODEL  1976 KAWASAKI KZ900 FET  BASE, 2nd             ENGINE  .9 LITRE  4
DRIVER   JB                  TEST WT.      0 KG.      GVW    0 KG
WET BULB TEMP  13 C          DRY BULB TEMP  27 C      REL. HUM.  14.1 PCT
SPEC. HUM.   3.2 GRAM/KG     BARO.  748.8 MM  HG.     MEASURED FUEL  0.00 KG

  RUN DURATION           12.75 MINUTES
  BLOWER INLET PRESS. 1689.1  MM. H20
  BLOWER DIF.  PRESS. 1841.5  MM  H20
  BLOWER INLET TEMP.      43  DEG. C
  DYNO REVOLUTIONS      9970
  DISTANCE TRAVELED   16.57  KILOMETRES
  BLOWER REVOLUTIONS    15660
  BLOWER CU. CM /REV.  7944

  BAG RESULTS
   HC   SAMPLE  METER READING/SCALE              29.1/3
   HC   SAMPLE  PPM                               291
   HC   BACKGRD METER READING/SCALE               1.9/3
   HC   BACKGRD PPM                                19
   CO   SAMPLE  METER READING/SCALE              60.2/2
   CO   SAMPLE  PPM                              3116
   CO   BACKGRD METER READING/SCALE                .5/2
   CO   BACKGRD PPM                                19
   CO2 SAMPLE  METER READING/SCALE               39.6/3
   CO2 SAMPLE  PERCENT                             .67
   CO2 BACKGRD METER READING/SCALE                3.2/3
   CO2 BACKGRD PERCENT                             .05
   NOX SAMPLE  METER READING/SCALE               36.8/2
   NOX SAMPLE  PPM                               36.8
   NOX BACKGRD METER READING/SCALF                 .6/2
   NOX BACKGRD PPM                                  .6
   HC   CONCENTRATION PPM                         273
   CO   CONCENTRATION PPM                        3094
   CO2 CONCENTRATION PCT                           .62
   NOX CONCENTRATION PPM                          36.2
   SO2 COCENTRATION PPM                           0.0
   HC   MASS (GRAMS)                             14.93
   CO   MASS (GRAMS)                            335.66
   CO2 MASS (GRAMS)                            1088.37
   NOX MASS (GRAMS)                               5.26
   SO2 MASS (GRAMS)                               0.00

HC  GRAMS/KILOMETRE       .90
CO  GRAMS/KILOMETRE     20.25
CO2 GRAMS/KILOMETRE     65.67
NOX GRAMS/KILOMETRE       .32
SO2 GRAMS/KILOMETRE      0.00

HC  GRAMS/KG OF FUEL  28.46     HC  GRAMS/MIN   1.17
CO  GRAMS/KG OF FUEL  634.7     CO  GRAMS/MIN   26.3
CO2 GRAMS/KG OF FUEL   2074     CO2 GRAMS/MIN     85
NOX GRAMS/KG OF FUEL  10.03     NOX GRAMS/MIN    .41
SO2 GRAMS/KG OF FUEL   0.00     SO2 GRAMS/MIN   0.00
CARBON BALANCE FUEL ECONOMY                 23.20  KILOMETRES/LITRE
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APPENDIX F

ENGELHARD CATALYST ANALYSIS REPORT

ENGELHARD

ENGELHARD INDUSTRIES DIVISION
ENGELHARD MINERALS & CHEMICALS CORPORATION
MENLO PARK • EDISON, NEW JERSEY 08817 • PHONE (201) 548-2200

AUTO EXHAUST CATALYST GROUP

Report No. RSA-77-5

RETURN SAMPLE ANALYSIS REPORT

Log. No. (See Serial No. Entry)

Date 8/31/77

Customer: Southwest Research Institute

Date Received: June, 1977

Unit Model: Special
PTX-314 (two ceramic pieces)

Reason for Return:
Break-up of front catalyst piece in three converters.

Serial No.:

Log No.	Serial No.	SRI No
73-40	7035011	1
73-42	7035012	3
73-41	7035013	2

SUMMARY

Three PTX-314 catalytic converters were used on a three-cylinder, two-stroke motorcycle at Southwest Research Institute. The first (front) one inch of catalyst length was a low cell density material and the remaining three inch catalyst piece was a high cell density material butted up against the front piece. Ceramic felt was utilized for the resilient material. At Southwest, at least one converter exhibited high back pressure, and, upon further investigation, all three converters were found to have only small pieces of the low cell density piece remaining - at about 500 catalyst miles. Pieces of this ceramic partially plugged up the rear 3 inch pieces of ceramic to produce the back pressure effect.

Analyses at Engelhard provided one likely means of failure which was triggered by the break-up of the low cell density material. The break-up may have been caused by a thermal shock experienced by each of the front catalyst pieces when the motorcycle ran out of gasoline on the road. Further, catalyst heating would have occurred when the motorcycle was pushed in an attempt to restart the engine.

INTRODUCTION

Three catalytic converters - one for each cylinder of a three cylinder motorcycle - were returned from Southwest Research after it was noted that the front pieces of the catalyst within each of the converters had broken up. Previously, it was noted that the back pressure through one of the converters had apparently increased substantially. Total mileage accumulation was about 500 miles. Attachment A is the letter from Southwest that accompanied the three converters. One item stated in the letter was thought to be potentially harmful to these converters; namely, the fact that the motorcycle had run out of gasoline and was pushed in an attempt to restart it. The concern here was the potential of overheating the catalyst due to misfiring accompanying fuel run-out - and also while pushing to restart.

The three converters - for the Kawasaki KH-500 - were designated PTX-314 units and had a universal construction:

- 3 inch diameter shell
- 1 inch thick piece of low cell density (LCD) substrate
- 3 inch thick piece of high cell density (HCD) substrate following the LCD substrate
- the two catalyst pieces butted up against each other. Total catalyst length was 4 inches.
- ceramic fiber mat used for the resilient mounting of both pieces

ANALYSES

Visual examination of these three returned converters revealed that (similar for all converters):

- The front LCD piece had broken-up. However, a piece of this subsubstrate was remaining for each of the three converters. In each case, the piece was somewhat rounded, which would result from abrasion in the exhaust flow within the converter.
- The HCD substrates were intact, however, about one-half of the channels were plugged-up in each converter. From the appearance of the plugging material, it was probably abraded substrate from the LCD and/or ceramic felt-material from the resilient mounting. The resilient mounting for the LCP was missing from its normal location inside the converter shells.

Samples of the LCD pieces as well as drilled-out pieces from the rear (outlet) face of the HCD pieces were submitted for BET surface area analyses - as in indication of temperature exposure. Attachment B lists the percentage reductions in surface area relative to a virgin catalyst. These values indicate that the LCD pieces were subjected to somewhat excessive temperatures, whereas the HCD rear pieces were not exposed to this condition. Although catalyst activity of the catalysts (while intact) was not the primary concern at this time, the loss of surface area on the front pirces was not sufficient to cause a measurable loss in catalyst activity.

The sample of LCD material from Log No. 73-40 converter was also analyzed for catalyst poisons - recognizing that the mileage accumulation was very low. Attachment C lists the semi-quantitative analyses of potential poisons and lube oil ash components. As anticipated, it may be concluded that the poison levels were too low to be of concern toward catalyst activity.

CONCLUSIONS

The three converters failed at low mileage because of the break-up of the front LCD pieces in each catalyst. Material from the pieces, as well as from the ceramic felt - which was used as the resilient material - subsequently plugged the 3 inch long catalyst piece such that about 50 per cent of the channels were blocked. This, in turn, caused the increased back pressure noted by Southwest Research.

It is difficult to pin-point the exact cause of the break-up of the LCD pieces. Similar converters using two pieces of ceramic and a ceramic felt resilient material have been tested on a 2-stroke motorcycle engine for up to 10,000 miles without mechanical failure. The most likely causitive factor for the failure of the subject Southwest Research catalysts was the high temperature exposure and thermal shock associated with the running out of fuel on the road. If the thermal shock caused the LCD material to crack, it may be possible for the strong exhaust pulses of the two-stroke engine to flex the catalyst and eventually cause its destruction. A thermal shock exposure is consistent with the high temperature exposure reflected in the measured BET surface areas. Further, the fact that only the front of the converter was exposed to high temperature indicates that the exposure would have occurred when the exhaust gas flow was relatively low and the exposure was only for relatively brief periods of time. This set of conditions may have been present during the fuel run-out and the attempt to restart the motorcycle.

ATTACHMENT A

SOUTHWEST RESEARCH INSTITUTE
8500 CULEBRA ROAD • POST OFFICE DRAWER 28510 • SAN ANTONIO, TEXAS 78284

June 15, 1977

Dr. James Hansel
Engelhard Industries
497 Delaney Street
Newark, New Jersey 07105

Dear Dr. Hansel:

Enclosed are the three (3) catalysts used on the Kawasaki KH-500. As discussed in the phone conversation on June 15, 1977, these catalysts were used for approximately 300 miles of dyno testing with approximately 60 miles of road testing prior to engine seizure via lean combustion mixture and air injection. The engine was rebuilt and the carburetors were reset to stock settings (rich).

Distance accumulation procedures were started. After approximately 150 miles, the motorcycle ran out of fuel and the operator tried to push start the motorcycle before checking the fuel level. The KH-500 was refueled - no driveability problem was apparent for the next 100 miles of road work. A loss of power was noted and oil-carbon mix was beginning to appear at the exhaust flange of the right pipe. It was evident that the backpressure had increased as engine performance degraded rapidly, after about 275 miles (total) of break-in had been accumulated. Subsequent inspection of the right catalyst assembly (# 3) showed that the Torvex was almost completely gone. Inspection of the other 2 catalysts showed similar signs of "burn-out". Substrates appeared to be intact although they were effectively plugged for the most part. In addition fiberous insulation material was observed to be piled up at the tail pipe exit of the right cylinder pipe (# 3).

The maximum catalyst exit temperatures reached during air injection testing were 645°C, 770°C, and 600°C for the left, middle and right cylinder exhaust. These temperatures occurred at 50 mph with approximately 2.4 cfm air distributed to the three cylinders by a common manifold. If additional information is needed please feel free to contact me.

Yours truly,

Terry Ullman

Terry L. Ullman
Research Engineer
Department of Emissions Research

TLU/rdt
enclosure

SAN ANTONIO, HOUSTON, CORPUS CHRISTI, TEXAS, AND WASHINGTON, D.C.

ATTACHMENT B

SURFACE AREA ANALYSIS

	% Reduction in Surface Area Relative to Virgin Catalysts
73-40 Ser. No.7035011	
Low Cell Density Material	46
High Cell Density Material (outlet face)	8
73-41 Ser. No.7035013	
Low Cell Density Material	21
High Cell Density Material (outlet face)	10
73-42 Ser. No. 7035012	
Low Cell Density Material	21
High Cell Density Material (outlet face)	6

ENGELHARD
INDUSTRIES

ATTACHMENT C

CHEMICAL ANALYSIS

73-40 Ser. No.7035011	Low Cell Density Piece
Pb	.01%
P	None Detectable
Zn	.001%
Ca	.02%
Ba	.002%
Fe	.03%